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The Chain Industry in Great Britain

A Comprehensive Picture of Manufacturing Conditions and Methods, Including Labor Relations—Wages and Other Costs

BY PAUL M. TYLER*

NEXT to the United States, the United Kingdom is the largest producer of chain in the world, and, until comparatively recent years, British chain makers excelled those of all other countries both as regards volume of output and quality of product. All classes of chain are produced, the industry falling naturally into four branches, viz., (1) Driving and sprocket chain; (2) Proof coil and ship's cable; (3) Common coil chain, such as dock chain, trace chain, and chains for general industrial and agricultural purposes; and (4) Miscellaneous light chains of iron, steel, or other metals and used for various purposes where little strength is required. The last group is generally classed as hardware and is made chiefly in the Birmingham area by various small firms. It includes a certain amount of harness chain, so-called weldless chain (made from stamped links), wire chains and all classes of brass chain and fancy chain for ornamental use.

The divisions among the different branches of the industry are more sharply drawn in England than in the United States. Driving chains of all kinds are machined products and are all made by firms that specialize on this type of chain, although two of them manufacture bicycles or bicycle parts. All of the manufacturers of bicycle chains are located in Manchester, Coventry or Birmingham, although there is one manufacturer in Sheffield who makes a certain amount of chain for use in conveyors.

The manufacture of welded chain is highly localized in the Cradley district and practically all the shipping tackle and welded coil chain used in cranes, hoists, etc., is made in Cradley Heath or the adjoining towns of Tipton and Netherton, although there is a comparatively small amount of chain made at engineering works in Sheffield. The manufacture of anchors is an allied industry and these are made in South Staffordshire by certain of the same firms which make heavy ship's cable.

Driving and Sprocket Chain

The bulk of the driving and sprocket chain produced in the British Isles comes from the five firms which comprise the Association of British Driving Chain Manufacturers, as follows: Brampton Brothers, Ltd., Birmingham; Coventry Chain Co., Ltd., Coventry; Hans Renold, Ltd., Manchester; Alfred Appleby Chain Co., Ltd., Birmingham; Perry & Co., Ltd., Birmingham.

All of these firms manufacture cycle chains. The Appleby company also makes motorcycle chains, while the first three make, in addition to bicycle and motorcycle chains, heavy roller chains and inverted tooth chains of all classes. The Coventry Chain Co., and Hans Renold, Ltd., specialize on the manufacture of chains, and chains are the main product of all these firms except Perry & Co., who make bicycles. Brampton Brothers, however, are also manufacturers of saddles for bicycles and motorcycles.

An important function of the association has been the standardization of driving chains and the cutter forms used in their manufacture. Up to about ten years ago there was practically no standardization, each firm making its product according to its own designs. Most of the output then consisted of block chain (connected by double, flat links) and little attention was given to the character of the sprocket upon which they were to run or to the design of the teeth. With the development of the motorcycle, however, a more efficient type of chain was demanded and roller chains are now made almost to the exclusion of the old block chain. The British standard chain as now developed is slightly different from that used in the United States, but in most cases the difference is so slight that British

Standards for Roller Chains

Association Chain No.		Pitch	Max. Roll Dia.	Minimum Width Between Plates		Minimum Depth of Shroud Seating	Max. Width of Tooth	
Narrow	Wide	(In.)	(In.)	Narrow (In.)	Wide (In.)	(In.)	Narrow (In.)	Wide (In.)
3 N	3 W	3/8	0.250	0.155	0.230	0.070	0.145	0.220
Cycle Sizes		1/2	0.305	0.130	0.192	0.050	0.120	0.182
4 N	4 W	1/2	0.335	0.205	0.305	0.094	0.195	0.295
5 N	5 W	5/8	0.400	0.255	0.380	0.117	0.245	0.370
6 N	6 W	3/4	0.475	0.310	0.460	0.140	0.295	0.445

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chains will run on American sprockets and vice versa.

The new association standards for roller chains up to ¾-in. pitch are given in the table on page 183.

The process of manufacture requires no special description, as the methods used are practically identical with those employed in the United States, the connecting links being stamped by automatic machinery from sheet steel, the rollers being forged and turned, and the pins being made from hardened rod. The machinery used is partly of American and partly of British manufacture. Only plain carbon steel is used, some of which since 1914 has been imported from the United States. The British manufacturers assert that their product is superior in workmanship and finish to that made in the United States, but they make no claims as to better material. The only important trade with the United States in this class of products is in bicycle chains, 5 ft. long.

The prices of driving chains have increased approximately 150 per cent since 1913. Late quotations on ½-in. pitch, twin-roller bicycle chains, such as those imported by bicycle and sewing machine manufacturers in the United States, are 11d. to 12d. (say 20 cents at present exchange) per foot, according to quality, as compared with 5d. or 6d. (10 or 12 cents at standard exchange) for the same grades, and with some grades selling as low as 3¾d. to 4½d., before the war.

Female labor is employed to a large extent in operating the automatic machines used in making all classes of driving chain. The minimum wages which, in this trade, are paid only to apprentice workers, are 5d. per hour plus 16 shillings per week war bonus plus a further bonus of 12½ per cent on the total weekly earnings. A 47-hour week is standard throughout the country, so the minimum weekly earnings amount to about 40 shillings ($9.72 per week at standard exchange). The older and more experienced workers earn approximately 50 per cent more than the minimum rates, most of them working on piece work. A small percentage of skilled male labor is employed, chiefly for keeping the machines in repair. This labor receives approximately 85 shillings per week ($20.65 at standard exchange). There is no suggestion of sweating in the industry and the workers are able to maintain a fair standard of living. Relations between employers and workers are quite friendly and differences are adjusted by conferences conducted on the Whitley plan. It has not been necessary to establish a trade board.

Chain Cable and Anchors

There are some ten to twelve firms engaged in the manufacture of heavy chain cable and anchors for the equipment of vessels. All these firms are located near Netherton in the Cradley Heath district, a few miles west of Birmingham. All the ship's cable is forged from local bar iron; cast steel links are not made in England as yet, since they are not believed to be as dependable as the forged and welded chain made from wrought iron. Local gas coke is used as fuel and, prior to the recent coal strike, could be obtained at 20s. to 30s. per ton according to quality. Metallurgical or other hard coke is not used in the forges, since the friable character of the local gas coke is a desirable feature.

Power hammers are used in making all the heavier chains and anchors, and the factories seem to be well equipped even according to American standards, although in several of the plants there is an undue amount of carrying material from one part of the plant to another. Much of this work is done by men with wheelbarrows, although there is some industrial track on which trucks are run. It is not uncommon, however, to see men wheeling heavy loads for several hundred feet over the bare ground which, except for an occasional stone, is deeply cut by ruts. It is stated that the first steam hammer installed in England was erected by Nasmith, himself, at the Chain and Anchor Works in Cradley.

Several firms purchase their bar iron in the district, but others make their own wrought iron in the same establishment. One of the largest firms, N. Hingley Sons & Co., Ltd., is completely integrated, operating a blast furnace plant (with two furnaces), and manufacturing anchors and chain in its large puddling works about a mile away. In all cases, the chief iron used is the famous Staffordshire bar iron, which is of exceptionally good quality and welds easily. In making anchors, however, a certain amount of steel scrap is apparently bundled with the iron.

Both workers and employers are organized and while, as in the case of other industries in this area, a trade board is in existence for the settlement of disputes, the men's union is sufficiently strong to force the employers to pay a higher scale than that fixed by the trade board. Early in 1920, the anchor and heavy chain makers were earning £10 ($48.65 at standard exchange) per week, and it was not uncommon to see them leaving the shops shortly after the noon hour. The work is almost wholly piece work and the men quit as soon as they have earned what they consider a satisfactory wage.

All the British shipping tackle is tested in proving houses under the supervision of the committee of Lloyds Register of Shipping. There are three of these proving houses in the Cradley district, all of which are operated by a company known as Lloyds British Testing Co., Ltd., which, however, has no financial affiliation with Lloyds Register. The testing works are situated at Netherton, Tipton and Cradley Heath, all within a radius of five miles. Tests ranging from a few pounds to 400 tons can be carried out in these proving houses.

The charges for testing are not easily obtainable by an outsider, but are apparently lower than those charged for such work in the United States, in view of the fact that the British differentials on the prices of certified chains as compared with the prices of those tested in their own works are much lower than the cost of certification in the United States. The matter of interlocking capital between the testing company and the chain makers is possibly a factor. The former chairman of the board of directors of the testing company was also the head of a large chain works, and from time to time the directorate of the testing company has included others interested in the chain business so, regardless of possible financial connections, the testing company is closely affiliated with certain of the chain manufacturing concerns.

Another feature which tends to lower the cost of certifying British chain is the matter of transportation. The forges are all located in close proximity to the proving houses, and the chains may be transported to and from the proving house and the factory or to the railroad by means of canals or short wagon hauls. The whole chain must be subjected to a certain strain and finally three links are taken out from any point in the chain at the discretion of the inspector for an actual breaking test. This involves the cutting out of five links which are only valuable as scrap, and also requires that the chain must be repaired at this point. Hence nearness and cheap transfer to and from the prov-

ing house form an important factor in the cost of testing.

The total length of chain cable tested in the United Kingdom under the anchors and chain cables act (British) during 1918 and 1919 at the proving houses under the superintendence of Lloyds Register of Shipping, was 457,756 fathoms. In addition, 114,338 fathoms were tested which did not come within the provisions of this act and also a quantity of miscellaneous chains and samples. The number of anchors tested was 9783.

Other Welded Chain

There are about 40 fairly large firms engaged in the manufacture of chain in the Cradley Heath district. All of these are members of the Chain and Anchor Manufacturers' Association. There are perhaps 20 other small establishments employing up to a half dozen hands each; but these generally market their product through one or more of the larger firms. In addition to the above, there are still a great number of outworkers who provide their own forges but are furnished with iron and, occasionally, with fuel, and who return the finished chain to the "manufacturers" after bending and welding the links. A much larger proportion of the workers, however, are now employed in the factories than before the war, although most of the lighter welded chain (up to 15/16 in.) made in England is made by outworkers and a fair amount of 1-in. up to 2½ in. chain is also made outside. Heavy mining chain, however, and chains for cranes and other heavy lifting work and which require to be tested are rarely made except in the factories which have their own testing machines for proving the product. Only a small part of such chains go to the central proving houses, whose main business is the testing and certification of shipping tackle.

The manufacture of machine-welded (electric-welded) chain is a more recent development in the district. At present most of the light chain, ranging from 13/32-in. down to No. 10 gage, is now welded electrically. The manufacturers claim that the electric welding method does not produce so strong a chain as the hand weld even when the same quality of iron is used. These chains, however, are used only for purposes where they are not subjected to any great strain and they are invariably made of ordinary mild steel instead of wrought iron.

None of the manufacturers of ordinary coil chain except those who also make ship's cable operate puddling furnaces; the general practice is to buy bar iron of the required diameter. Due to the short distance from the puddling furnaces to the chain works, transportation to the latter is cheaper than to railroad shipping points and delivery rarely adds over 1d. or at most 2d. per cwt. to the cost of the iron, which is therefore a trifle less, delivered at the works, than the published quotations for Staffordshire bar iron. In January, 1920, manufacturers were paying 25s. 10d. per cwt. on sizes ranging from ½ to 3 in. diameter, with the usual extras on smaller bar and discounts on larger sizes. In October the price was £31 10s. per cwt. Very little steel is used for hand hammered chains.

For all but the heaviest work, the fuel employed is "gleeds," which is the coked cinder from local puddling works.[1] This fuel makes a clean hot fire and, due to the presence of a small amount of slag or a fusible ash, greatly facilitates welding. It is much more costly than the local gas coke, the average price in 1920 being about 60s. ($10.50 at present exchange) per ton or nearly twice as much as the cheap local coke. Before the war, gleeds cost about 35s. ($8.50). This fuel is more economical than the cheaper coke, since it makes the welding easier and since it contains no sulphur or other impurities that would injure the iron.

[1] This material sifts down through the grate bars of the fire box of the puddling furnaces. It looks like coke breeze, although, on examination, the particles are rounded and partly fused. It contains a high percentage of carbon.

Labor

Chain making by the hand methods largely employed in England calls for a high degree of skill on the part of the workers. This skill can be acquired only after long years of experience in the trade. An ordinary blacksmith is extremely slow at such work and, conversely, the chain makers are specialists who can rarely do any other work at the forge. The rapidity with which a chain maker can cut and bend a link and weld it is remarkable. On smaller sizes, it is not uncommon to see a man, working alone, making chain from rod at the rate of 100 links an hour. The only equipment necessary, in addition to a fire, is a light anvil and a home-made dolly with the top half hinged so as to be quickly knocked down or up by a tap of the hammer.

The usual practice is to keep four pieces in the fire—one straight rod heating up, another rod with the end bent in a hook so as to form one bend in the link (but not cut off), a third piece in the form of a link with the ends not scarfed or closed, and a fourth piece with the ends closed and attached to one end of the chain; this last piece is put in the hottest part of the fire so as to bring it to a welding heat.

The chain maker advances each operation successively and with great rapidity. Taking the straight rod out of the fire, he bends it once over the horn of the anvil and places it back in the fire. Next, he takes out the second rod, cuts off a link and bends the ends slightly; this operation leaves a straight rod and a partly formed link, both of which he puts back into the fire. He then takes the partly formed link from the previous cycle, scarfs the open ends, slips the link over one end of the chain he is making, closes the link, and puts it back into the fire to bring it to a welding heat. Finally, he pulls the other end of the chain out of the fire and welds and finishes a new link. This completes one cycle of operations.

It will be noted that considerable watchfulness is necessary, since the straight bar of one cycle of operations is the bar with a bent end on the next cycle, and since a new link is placed on either end of the chain alternately. Furthermore, it requires a great deal of experience to maintain the heat on each piece so that it will be at the proper temperature at the proper time. Generally, there is a momentary rest between each cycle which allows the worker to look out for his fire. The writer, however, timed an outworker for ten minutes and found that the man completed a link of ⅜-in. chain in the extraordinary average time of 25 sec. This cannot be taken as an average for an entire day, as the man knew he was being watched and was trying to make a record. He also kept an extra rod in the fire throughout this period so as to be able to get his initial heat in this short time. But this illustration indicates the remarkable rapidity at which they can work.

Manufacturers claim that they are threatened with a shortage of labor due to the preference of the younger generation for less arduous occupations which, at least under present conditions, yield practically equal wages. The most serious loss in number of workers is among the women who for-

Journeyman Outworkers' Block Chain Price List (per cwt.)

Size of Iron	Links per Foot	Short Link Ordinary	Long Link Ordinary	Short Link Special	Long Link Special
		s. d.	s. d.	s. d.	s. d.
No. 8	..	284 0	256 6	312 5	282 0
7	..	215 10	199 10	237 4	219 9
6	19	160 1	145 0	176 0	159 6
5	17	116 6	110 10	128 0	122 0
4	16	94 10	.. ..	104 3	.. ..
3	16	86 9	81 5	95 5	89 7
2	14	71 5	63 10	78 6	70 3
1	13	57 1	.. ..	62 10	.. ..
9/16	13	49 10	46 3	54 10	50 10
11/32	12	43 2	38 11	47 6	42 10
3/8	..	37 0	32 3	40 10	35 5
7/16	..	26 6	.. ..	29 3	.. ..
1/2	..	21 10	.. ..	24 0	.. ..
9/16	..	20 1	.. ..	22 1	.. ..
5/8	..	19 9	.. ..	21 8	.. ..
11/16	..	18 11	.. ..	20 10	.. ..
3/4	..	18 1	.. ..	19 11	.. ..

Factory Price List for Stud, Short and Open Link Chains, Endwelded (per cwt.)

Sizes In.	Common s. d.	Test s. d.	No. 2 Best s. d.	No. 1 or Special s. d.	Compo, Farnley, Low Moor and All Brands of Yorkshire Best Iron s. d.	Steel s. d.
1/4	50 9	54 10	58 10	67 7	77 5	103 10
9/16	35 6	38 2	40 7	45 9	57 7	70 2
3/8	22 2	24 10	28 3	32 10	42 0	50 9
7/16	18 0	20 0	22 2	25 0	33 7	40 2
1/2	13 6	15 7	18 0	21 2	25 2	29 8
9/16	12 2	13 11	15 2	17 11	22 2	27 3
5/8	11 2	12 5	14 1	16 1	19 6	23 4
11/16	10 7	11 9	13 1	14 9	17 7	21 9
3/4	10 1	11 1	12 4	13 6	16 1	20 0
13/16	9 7	10 5	11 6	12 2	15 2	19 4
7/8	9 0	9 7	10 10	11 11	14 3	18 0
15/16	8 4	9 1	10 3	11 3	13 7	17 1
1	8 1	8 10	9 8	10 8	13 2	16 7
1 1/16	7 9	8 4	9 1	10 3	13 2	16 7
1 1/8	7 4	8 0	8 10	9 11	13 2	16 7
1 3/16	7 0	7 9	8 4	9 5	13 2	16 7

Stud Chain List (per cwt.)

Sizes In.	Common s. d.	Test s. d.	No. 1 or Special Best s. d.
1 1/16	10 2	11 5	14 6
1 1/8	9 3	10 2	13 0
1 3/16	8 5	9 3	11 8
1 1/4	8 0	8 10	10 6
1 5/16	7 4	8 0	9 6
1	7 0	7 8	8 10
1 1/16	6 8	7 3	8 0
1 1/8	6 4	6 11	7 9
1 3/16	6 0	6 10	7 4

NOTES: All sizes of stud chain under 1 1/16 in. are paid for at the same price as short link chain.

Ten per cent extra for one gage and 20 per cent extra for two gages, when required to be used, for all sizes and qualities of chains specified on the above list.

Twenty per cent extra to the above prices for making wheel chains.

All sizes and qualities of stud chains (dollied) when required to be made to dimensions less in length of link than six diameters of the size of the iron (outside measurement), extra prices to be arranged between employer and workman before starting to make the chains.

All links cut or sheared for workmen free of charge.

NOTE: Weston's lengths of link to be the standard length for long and short link. All chain longer than Weston's' long link to be paid for at long list price. Longer than Weston's short link and not so long as Weston's long link, to be paid for at Weston's short link prices. Shorter than Weston's short link to be paid for at the *following extra rates:*

	Per link per ft. per cwt. extra s. d.
No. 6	3 0
5	2 10
4	1 1
3	1 1
2	1 0
1	1 0
5/16	1 0
11/32	1 0

Imperial wire gage is the standard legal gage.

merly made a large part of the lighter chains in their own homes. It has been a family industry, the children learning the trade from their parents, and many married women preferring to work at home during their spare time in order to bring up the earnings of the family. Now that the male workers are receiving better wages, it is not so necessary for the women to work, and those that do work are more inclined to seek employment in factories, either running the automatic machines which make electrically welded chain or working in the hollow ware factories which are located in the same vicinity. It is estimated, however, that at the present time there are from one to two thousand women employed in chain making either in factories or in their homes. Before the war, the number was much larger.

There is a clear distinction now between the work done by the women and that done by the men. In outwork, the former make only the smaller hand hammered chains used principally for agricultural purposes, while the larger chains, above 11/32 in., together with the better class of chains known as "dollied" or "tommied" chains (which are swaged after being welded), are made exclusively by men. In the factories, women are employed only in operating the electric welding machines, which is comparatively light work.

Wages

Practically all classes of labor are on piece work. The earnings range from £3 to £10 per week, depending upon the skill of the workers and their application to their work. A fair average of the earnings of experienced male chain workers in the Cradley district is £6 per week of 47 hours, which is fully three times the average earnings in 1913. Women operators in the factories are mainly on time work and receive between 30s. and 40s. per week. Before the war, the net earnings of the women rarely exceeded 12s. per week. The minimum rate as established by the trade board was 2¾d. per hour and was rarely exceeded. Women workers, including outworkers, are now organized to a considerable extent, being affiliated with the National Federation of Women Workers. Almost all of the men are members of the local chain makers' union.

All piece work is paid for according to price lists which are fixed from time to time by agreements between the unions and the employers' association. The prices of the list are paid irrespective of sex, and in the few cases where old men make the sizes of chain ordinarily made by women, they receive the same price. The above lists went into effect on Sept. 1, 1919, and were still in force in the spring of 1920.

The above rates constitute practically the whole labor cost in the manufacture of chain in the district. According to union officials, they permit the workers to earn considerably in excess of the minimum rates as established by the trade board. These rates range from a minimum of 6½d. to a maximum of nearly 2s. per hour, depending upon the experience of the worker and whether he is working on light or heavy chain, when the employer provides the workshop, tools, fuel and the iron.

Costs

Raw material is the main item of cost in the heavier classes of welded chains, while labor constitutes the largest element in the cost of light hand welded chains. The two items are of practically equal importance in the manufacture of ordinary hand welded coil chain in the sizes 13/32 to ⅜ in. Fuel is the only other item of importance, and this runs quite uniformly in all sizes of chain at roughly one-third of the labor cost. In the case of hand-welded chain, interest and depreciation on plant are negligible factors when distributed over the prod-

(*Continued on page* 236)

Tinning Methods and Tin House Equipment

Arrangement of a Modern Tin House and Machinery for Coating and Cleaning — The Thomas Automatic Tinning Machine

BY CLEMENT F. POPPLETON

THE manufacture of tin plate, from the bar to the box, was described in an article by the author which was published by THE IRON AGE in the issue of Jan. 3, 1918. The present article deals with the tinning process in fuller detail. The base of commercial tin plate is a flat bar, usually 8 in. wide and of thicknesses varying according to the gage of the finished product. The bars come from the steel works in lengths of about 30 ft. and are sheared at the tin plate mill to the required length. The length of the bar is the width of the plate, since all elongation caused by the action of the tin plate mill rolls is at right angles to the original elongation of the bar. After the bars are sheared to the requisite lengths they are heated in the sheet and pair furnaces, a full description of which appeared in the article on sheet pair and annealing furnaces, which appeared in THE IRON AGE, Sept. 16 and 23, 1920.

When the bars have reached the rolling temperature, which is between 1800 and 2000 deg. Fahr., they are passed through the hot rolls four to six times singly with the length of the bar parallel to the rolls, after which the roller places one of the now embryo plates or sheets on top of another and continues to pass the doubled sheets through the rolls until the heat is exhausted. It is impossible to roll tin plate thin enough at one heat. This makes necessary the next process, that of doubling, in which the two sheets are doubled one over the other in a doubling shear, consisting of a lever arm doubler and a lever arm shear set at right angles, and worked in conjunction. The operator takes the two sheets and doubles them one on the other by hand, then places them under the doubling arm, which squeezes them flat one on the other. Reversing the pack, he shears the smallest possible portion from the doubled end and then repeats the doubling process, getting finally a pack of eight sheets, which must now be re-heated.

The heater places the pack in the sheet portion of the sheet and pair furnace, where it is brought up to rolling temperature again. The sheets are passed through the rolls again until the heat is exhausted, or the required thinness is reached. In order to accomplish this it is necessary that the screw boy tighten his screw after each pass. The pack comes from the rolls with irregular edges, which are usually blunt pointed on the front end, "fish bellied" on the sides and "fish tailed" on the back end. A machine called a squaring shear is used to square these edges. The action of the hot rolls has a tendency to weld the sheets together, so that it becomes necessary at this stage to separate the pack into the individual sheets. After being worked in the hot rolls they are hard and dirty, and to clean and soften them they are pickled and annealed.

The pickling process is necessary to clean the plates of every particle of dirt, grease and scale; if this were not done the coating of tin would not adhere to the steel base. The next step, therefore, is to take the plates to the black pickling machine, so called to distinguish it from the white pickling machine which is used after cold rolling. The Mesta machine, quite generally used for this purpose in the United States, consists of a vertical steam cylinder, the plunger of which carries arms from which are suspended four acid-proof crates that dip into acid vats below. The plates are packed in the crates and are plunged up and down, first in a vat containing a strong solution of acid (about 10 per cent), then in one with a weaker solution, and finally in a third containing water. After the pickling process the plates are taken to the annealing furnace.

Annealing softens the plates, but the process opens the pores on the surface, and if tinned in this state they would take up too much tin and would not present the bright, silvery appearance desired; consequently the plates have to be cold rolled. This process consists of passing the plates three times through stands of cold rolls whose function is to close the pores and planish the sheets. Cold rolls are very similar in appearance to hot rolls, but they have a finer surface and are usually lighter and smaller in diameter. This process hardens the plates again, so that it is necessary to re-anneal them. For this purpose use is made of a secondary annealing furnace exactly similar to the primary annealing furnace, but the plates are not allowed to remain in the furnace so long as in the first.

The cold rolling and re-annealing processes leave oxide and dirt on the plates which must be removed by means of a second pickling machine. This is a duplicate of the black pickling machine, but the solution is not so strong nor is the process continued so long as in the first instance. After the second pickling the plates are ready for tinning. It is important to protect the pickled surface from air as far as possible, so immediately after the pickling the plates are placed in water boshes usually mounted on wheels and taken to the dipper's stand at the tin pots, where they are

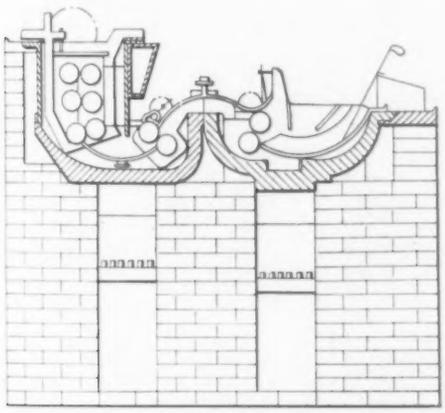


Fig. 1 (at left)— Sydney Duplex Tinning Pot

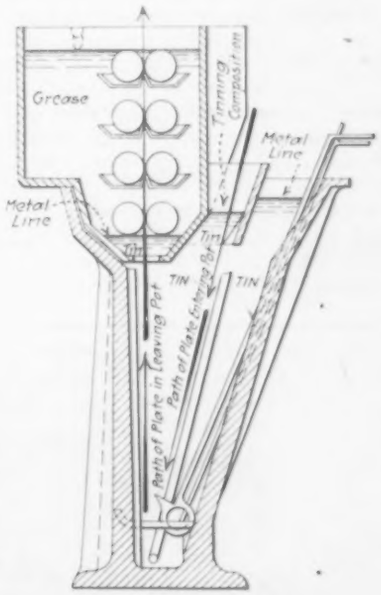


Fig. 2 — Morewood Tinning Pot

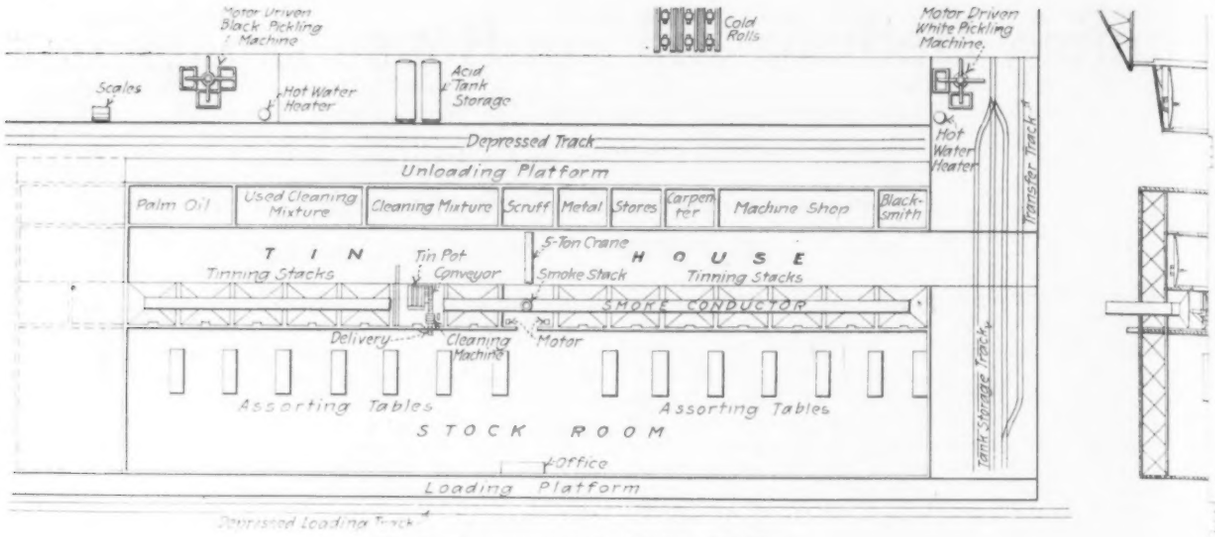


Fig. 3—Arrangement of a Modern Tin House

passed individually through the tinning machines.

Thirty years or so ago the method of tinning consisted of dropping the plates one at a time into a pot containing warm grease and then removing them to a pot containing molten tin covered with palm oil. After immersion in this for a short time they were removed, rapidly brushed on each side by a hand brush, and passed into a second pot containing tin at a somewhat higher temperature; thence they were removed to a pot containing molten palm oil to permit the superfluous tin to drain off, and finally placed in a rack to cool. The thickness of the coating of tin thus obtained was irregular, and an unnecessary amount of tin was consumed. A great improvement was effected about 1860 when the plates were passed through rollers revolving in the grease on the surface of the tin, through which they emerged from the last pot, which squeezed out any superfluous tin which might have adhered to the plate.

Single Pot Method of Tinning

In modern works the whole process is performed in one pot which is mechanically actuated. Use is made of a flux of chloride of zinc and a small amount of ammonium chloride, which lies on the surface of the molten tin and through which the plate first passes before entering the tin bath. This flux considerably hastens and cheapens the process while the plates have a cleaner and brighter surface when tinned in this manner, and now that the initial difficulties have been overcome the plates are equal in quality to those made in the older way.

The tinning rolls are of wrought iron, and are not polished as an inspection of the finished plate would lead one to suppose, but the marks made by the tool when turning them in the lathe are purposely left on them. The rolls are driven at a definite speed, which determines the amount of tin taken up by the plate, the quantity running usually to 2 or 3 per cent of the weight of the steel plates, the object kept in view here being to give what is known as a "coke finish" to a hundredweight of plates with 2 lb. 4 oz. to 2 lb. 6 oz. of tin. For special qualities 3 to as much as 6 lb. of tin per hundredweight of plates is used in exceptional cases.

The vertical type of tinning pot is suitable for plates of moderate size or thickness, but long or very thin plates are liable to double up when it is attempted to lift them from their bottom edge. The cold plates cool the tin and to prevent it being chilled and adhering to the plates in greater thicknesses than desired the molten tin must be kept very hot. Too much heat, however, causes the surface of the finished plate to lose some of its brilliance. The grease also gives off very annoying fumes if too highly heated, and may even take fire. These difficulties are overcome by employing tinning pots of the form shown in Fig. 1. The plate

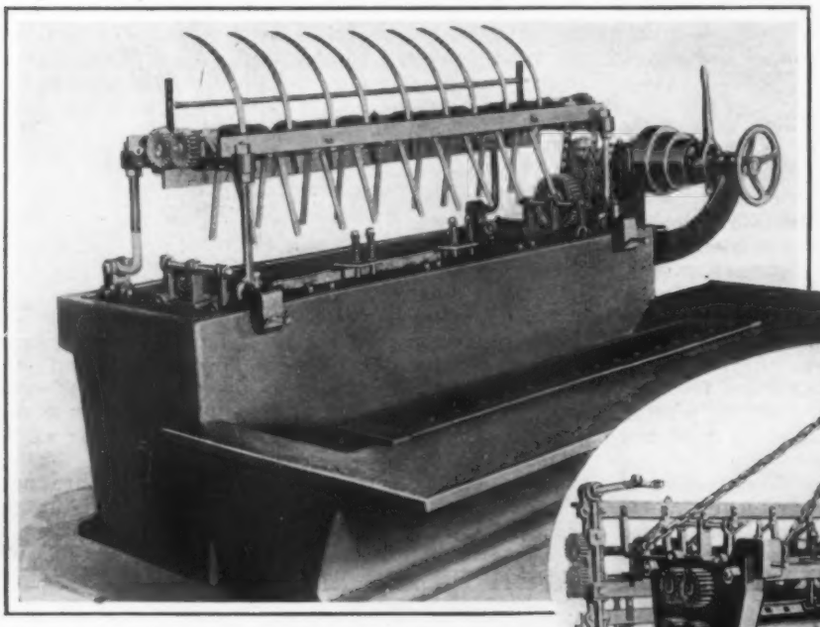


Fig. 4 (at left)—Multiple Tinning Machine

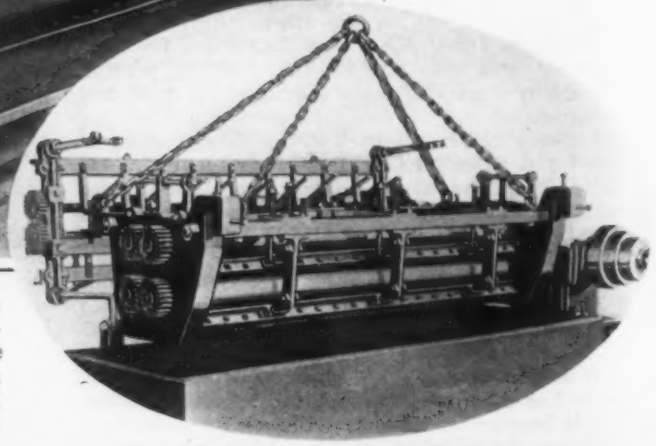


Fig. 5—Tinning Machine Removed from Pot

enters the pot on the right, the tin in which is maintained at a high temperature, and passes through the flux, lying upon the surface of the molten tin. When pushed forward it is diverted by the guides, which direct it upward between rolls, and on issuing from these it is diverted by other guides into the second pot, the tin in which is at a lower temperature. It then passes upward through the grease contained in the second pot. Since the two pots are entirely separate and separately fired, there is no difficulty in maintaining each at its most suitable temperature. There are three sets of guides in the width of the pot and a plate is fed along each successively. One man feeds the plates in and a second removes them to the cleaning machine.

The cooled plates are passed on to girls, who polish them by means of hand rubbers of sheep-skin, rubbing them with bran or sharps to remove the grease. In some of the larger and more recent works this process is performed by machinery, which consists of different arrangements of rollers covered with sheep-skin, which are revolved at varying speeds and between which the sheets are passed.

The polished sheets are put up into wooden boxes and are then ready for sale. The ordinary box contains 112 plates of 30 S.W.G. thickness, each sheet measuring 14 by 20 in. and weighing 1 lb. Plates are made in a great variety of sizes and qualities of finish, which are known in the trade by various names and marks which have been given to them by the workmen, a list of which would serve no useful purpose in the present work. From these are made the cans used for tinned meats and fruits, now so extensively used, and also numerous smaller domestic articles.

The foregoing, in as far as it applies to tinning proper is concerned, refers to the older type of tinning machine, which though still in use is being rapidly replaced by the modern tinning and cleaning apparatus, at least in up-to-date plants. The latter is fully described and illustrated further on in this article.

For some purposes a much heavier coating of tin is required than that ordinarily used for food containers and the like. To obtain this heavier coating a vertical tinning pot is employed called from its inventor's name a Morewood pot. A sectional view of this apparatus is shown in Fig. 2. With this pot the plates are fed by the dipper by hand and pass down the back guides until they engage in the hooks provided at the bottom of the pot for that purpose; the dipper then pushes the top ends of the plates over until they engage against the front guides when they point directly to the split of the rolls. The dipper then lifts the plates by means of the hooks until they are gripped by the rolls which are driven by means of a train of gears, the top pair having an extension with a pulley which is driven by means of a belt from a countershaft. The rolls are adjustable in the horizontal plane so that the distance between the rolls or the pinch may be varied, and consequently any desired quantity of tin may be deposited on the plate.

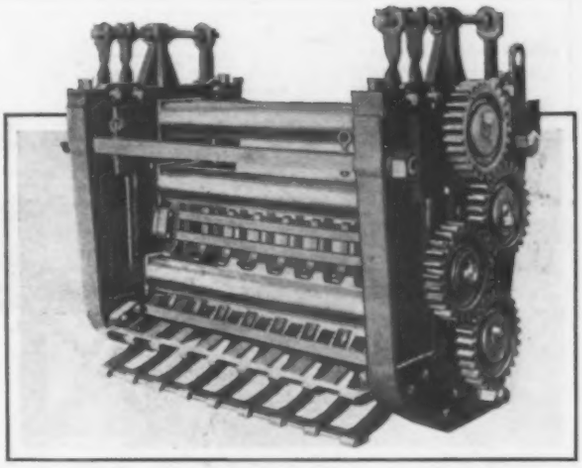


Fig. 6—Tinning Machine for Heavier Plates

This same apparatus may also be utilized for terne plate much used for roofing in the heavier gages. Terne plate is made by coating the steel base with a mixture of lead and tin, about two-thirds lead and one-third tin being the usual proportion.

Tin House Equipment

Fig. 3 is a plan of a modern tin house. The end of the cold mill train is shown and also the black and white pickling machines. The secondary annealing furnaces are placed at the other end of the cold mill trains. With such an arrangement a prime requisite of a successful tin mill is achieved, since the product does not pass over the same ground twice, going as it does from the black pickler to the primary annealing furnaces, thence through the three-pass tandem cold rolls, to the secondary annealing furnaces, and from there to the white pickler. A feature of this layout is the system of tank storage tracks, ample trackage being provided to take care of the requirements for a two-day run of the tin house. It does not hurt the pickled plate to remain in water; in fact, so long as the plate is entirely covered it improves with a week's immersion, as this serves to release the hydrogen from the pickle "pits" and hydrogen is always injurious to the protective coating, whether this be tin or spelter.

As will be seen from the layout the tinning and cleaning machines are arranged in one line with their assorting tables at right angles. This is an excellent arrangement, since ample floor space is provided for trucking around the tables, so that three trucks can be disposed around each table, one for primes, one for seconds and one for wasters.

It is possible to coat ordinary commercial tin plate with less than 2 lb. of tin per box of 100 lb. by the use of the following modern tin house equipment:

1. Cast iron tin pot, made of high grade, close grained iron and designed with an expansion chamber.
2. Tinning machine with four high carbon steel rolls accurately ground with necessary gears and housings to fit the tin pot.
3. Catcher to lift the plate from the tinning machine and place it on conveyor which consists of polished rolls and necessary driving mechanism.

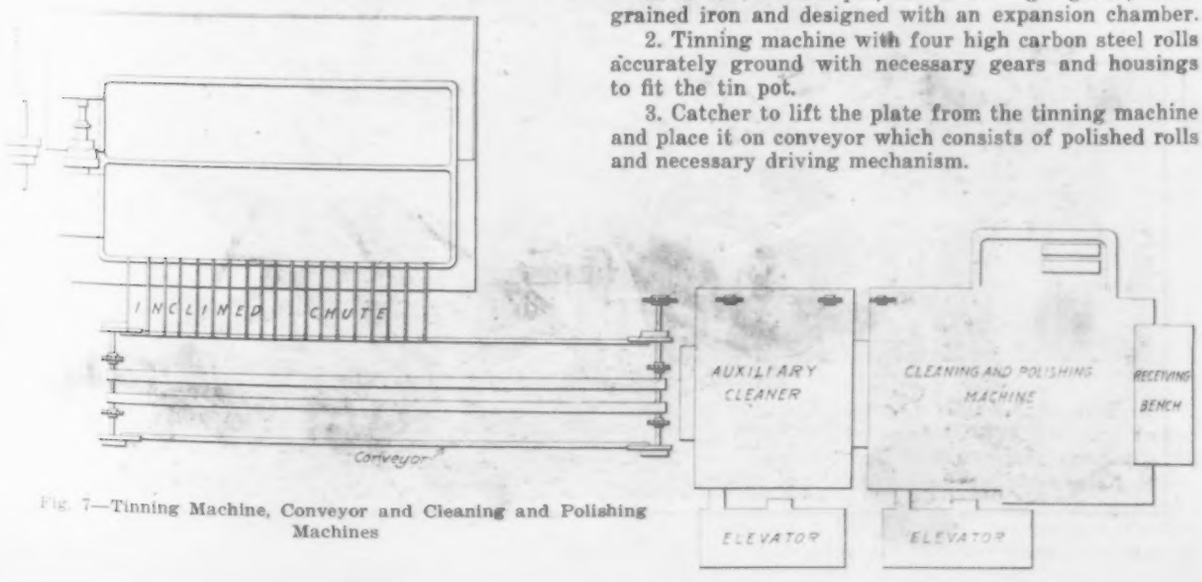


Fig. 7—Tinning Machine, Conveyor and Cleaning and Polishing Machines

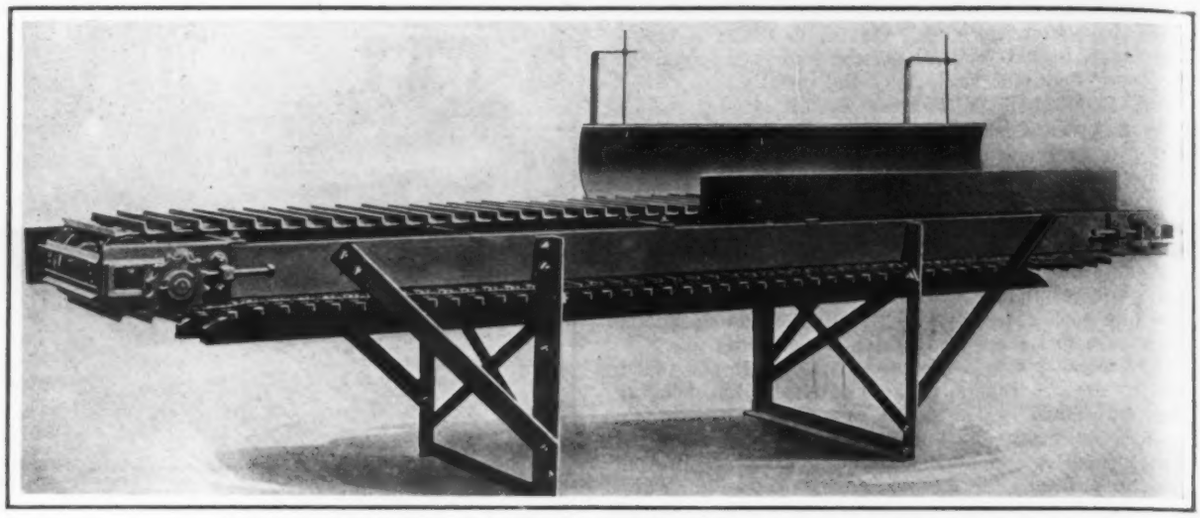


Fig. 8—Standard Conveyor Operating Between Catcher and Cleaning Machine

4. Eighteen-ft. channel conveyor, chain and slat combination with take up.

5. Forty-seven-in. improved cleaning machine consisting of six pairs of flannel disk rolls working in the mixture, one pair polishing, high grade bronze bearings, elevator for handling cleaning mixture, etc., complete. Primarily this outfit is designed to make coke plate.

The sheets are fed through the tinning machine, which in most plants ranges from 66 to 86 in. wide and which is known as the multiple machine. In feeding, the sheets are staggered over the width of the machine, feeding three or four sheets in width. By this means a much greater production can be secured, because more sheets are fed through the machine in a given time without increasing the speed in feet per minute.

Fig. 4 is one of the above mentioned multiple tinning machines, while in Fig. 5 is the same machine as it appears when removed from the tin pot. The catcher, which is an arrangement for turning the dipped plates on to the conveyor, is shown in Fig. 4. In Fig. 6 is a tinning machine specially designed for heavier sheets. The method of setting up the tin pot, tinning machine, conveyor, etc., is shown in Fig. 7. The plate is not touched by the hand until it reaches the receiving bench ready for assorting, where the plates are carried over to the assorting tables.

Fig. 8 is the standard conveyor, which takes the plates from the catcher of the tinning machine to the cleaning machine. This conveyor consists of a series of slats, which are angular in shape so that there is practically a knife edge on which the plates are carried. This construction is necessary to avoid marking the plates. The slats are carried on a canvas belt.

In Fig. 9 a standard cleaning machine is shown with auxiliary attachment, while Fig. 10 illustrates the standard type of elevator.

The modern cleaning machine as illustrated is a great improvement over those in use even a few years ago. Instead of the rollers being covered with sheepskin they are now made up of a series of disks of canton flannel which are compressed on a mandrel, making a better "buffing" roll, and being much cleaner and of much longer life, as the wear on these built-up rolls is evenly distributed, while the sheep-skin covered rolls always wore away in patches. The rollers are not all driven at the same speed, some being driven much faster than the others, thus enhancing the polishing action. Bran or a substitute is fed into the cleaning machine for the purpose of absorbing the surplus oil which is carried by the sheet.

The maker of these improved cleaning machines

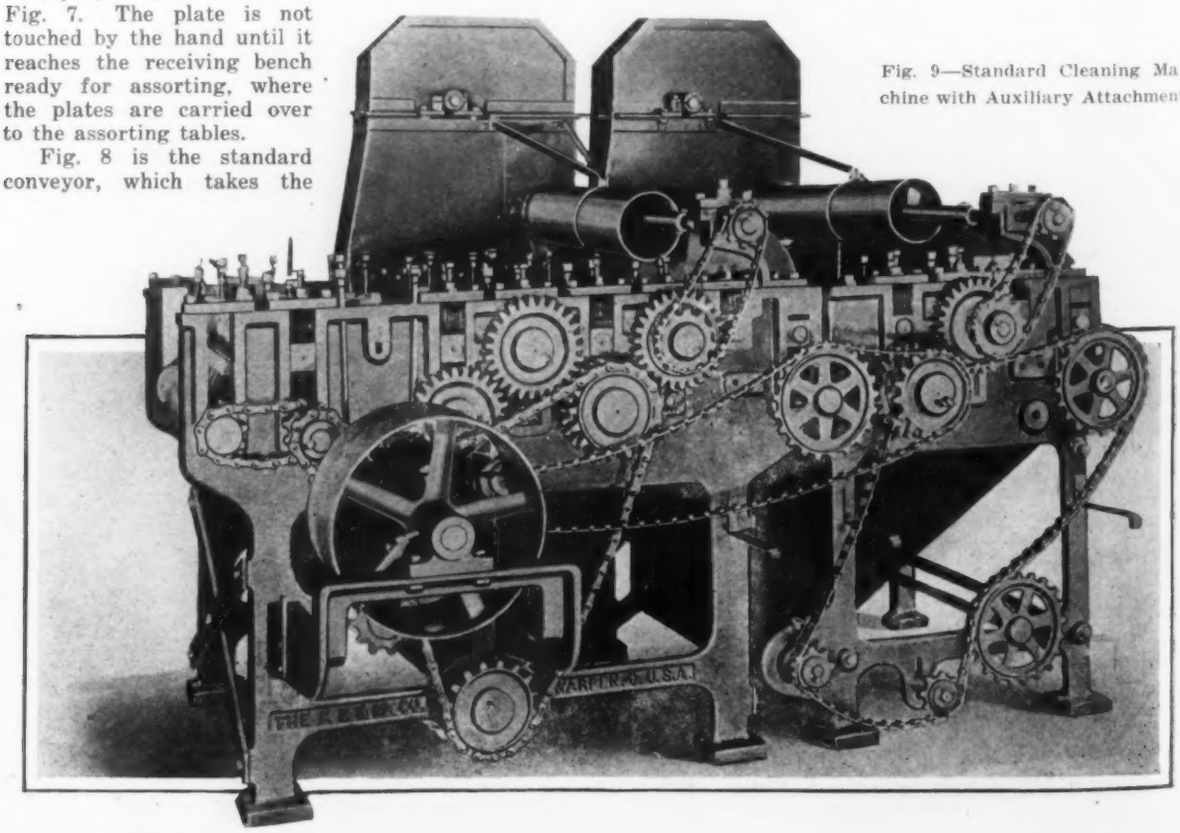


Fig. 9—Standard Cleaning Machine with Auxiliary Attachment

points out that by using an auxiliary machine most of the oil in the bran is absorbed, so that when the sheet passes into the main cleaning machine it is comparatively dry, and the bran can be kept very clean, thereby accomplishing a much higher degree of cleaning and polishing, and at the same time saving about 10 per cent of the bran.

The material used in the cleaning machines is usually wheat or rye middlings, although ground peanut shells are also employed successfully. The material after being used and becoming impregnated with the palm oil is now finding a sale among farmers for stock food, representing quite an advance along the lines of conservation. It used to be burnt and its disposal was more or less of a nuisance.

New Thomas Automatic Tinning Machine

Practically all the steel plates tinned in the United States are fed into the tinning pots by hand. The tinned plates leave the palm-oil bath automatically and drop upon a conveyor which operates at right angles to the tin pot. By means of this conveyor the plates are fed into the branning machine. A novel departure from this type of tinning machine was recently made by Spence Thomas, managing director, and W. R. Davies, general works manager, of the Melingriffith Tin Plate Works, Whitechurch, South Wales. This machine, Fig. 11, automatically feeds, pickles and polishes four plates at once, the plates traveling straight forward throughout the process.

Each machine is driven by a 20-hp. motor, occupies a space 20 x 30 ft., and has a normal capacity of approximately 125 boxes of tin plate per 24 hr.

After the plates are annealed, following the cold rolling process, they are piled on the four charging tables built side by side at one end of the machine. Serving each table is a cone-shaped rubber sucker, which is kept moist by sprays of water. The suckers are mounted on rocker arms, which operate simultaneously from the common shaft A in Fig. 11. This shaft is driven by gears keyed on to the left end. When the four rocker shafts bring the suckers in contact with the plates the top plate in each pile is transferred to the receiving tables B. These are built so that the sucker arms pass between, releasing the plates upon the tables. The sucker arms then return to their original position.

When the receiving tables are tilted the four plates drop side by side into the pickling baths C, where any effects of oxidation which may have occurred during the annealing process are removed. By means of lugs extending from the rim of the wheels D the plates are pushed between the first pair of a series of rolls, which, by the aid of stationary guides, direct the plates into the fluxing pans E. While the plates are in transit from the pickling to the fluxing baths they are drenched with water, the later draining underneath the rolls into the trough F. The pair of rolls built just over the charging end of the fluxing pot operate at an increased rate of speed and quickly force the plates through the fluxing solution. It has been found that by speedily passing the plates through the fluxing bath, considerable economy in the consumption of tin is effected inasmuch as the plates do not become dry or unduly heated.

The rocker arms G mounted on the shaft H push the plates into a pair of rolls which forward them into the tin pots I. By means of similar rolls and guides arranged in series, the plates are directed up through

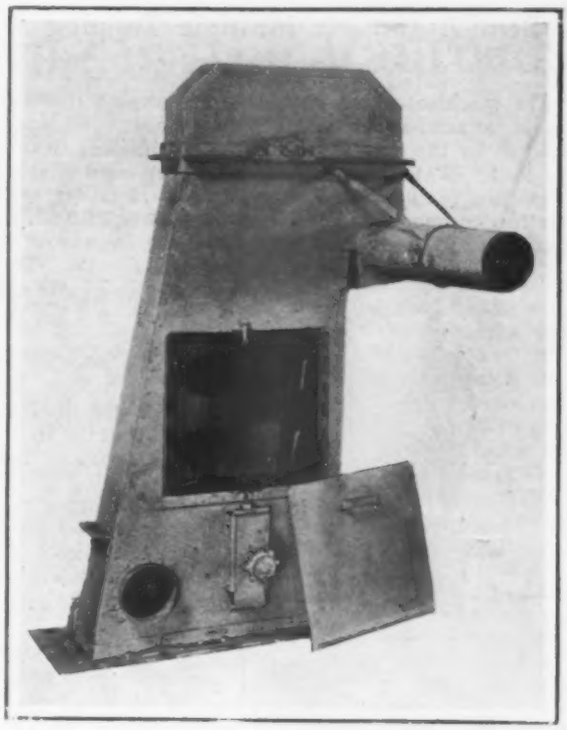


Fig. 10—Standard Type of Elevator

a solution of palm oil. Upon issuing from this bath they are caught between two rolls which squeeze off the excess tin. They are then directed into a double-type branning machine J, where revolving arms assist in thoroughly cleaning and removing the palm oil from the top surfaces. As the plates issue from the primary branning machines, they pass upward between guides until the lower edges are positioned just over the entrance to the secondary branning machines. A trip motion causes the plates to fall into the secondary cleaning apparatus with the reverse sides in position for branning. After this operation is completed the cleaned plates pass between four sets of dusting rolls K and then drop upon an endless conveyor L, which delivers them to a final series of burnishing rolls. The latter operate at right angles to the first set of rolls and impart a high polish to the surface of the product. The tin plate is then conveyed to the boxing department.

The author has no practical experience of the working of this device, but it is being used in South Wales. If one point of criticism stands out it is the inability to inspect the plates after they are white pickled and before they are tinned.

A full Thomas equipment will be installed in the Burma Oil Co.'s tin mill which is being erected at Sakchi, India.

The January meeting of the New York Chapter of the American Society for Steel Treating was held Wednesday evening, Jan. 19, at the Machinery Club, 50 Church Street, New York, and was addressed by E. F. Davis, Celite Products Co., New York, on "The Function of Insulation and Its Application to Heat Treating Furnaces," illustrated by stereopticon views. The usual dinner preceded the meeting.

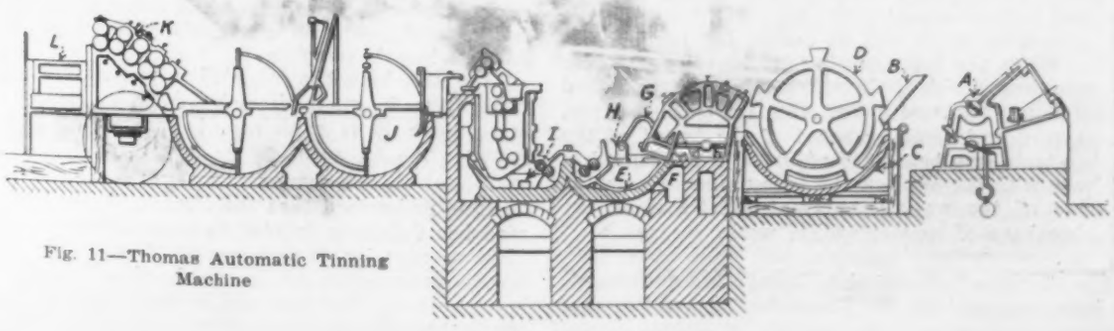
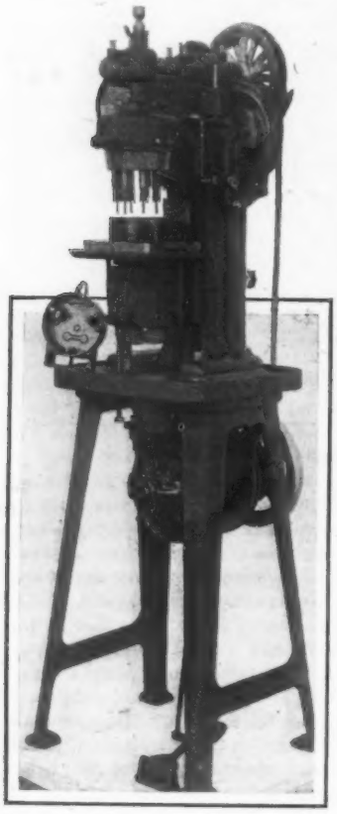


Fig. 11—Thomas Automatic Tinning Machine

Semi-Automatic Multiple Tapping Machine

The machine shown in the accompanying illustration is a semi-automatic multiple tapping machine, produced by the Langelier Mfg. Co., Arlington, Cranston, R. I. While this is not an entirely new design, interesting features have been added. It is for tapping in one operation nine 8/32-in. and two 10/32-in. holes in a meter case, and is now doing this work, it is stated, at the rate of six cases per minute. The machine can be attended by a boy or girl.



Nine 8/32-In. and two 10/32-In. Holes Are Tapped in a Meter Case in One Operation, Six Cases Being Produced a Minute. Tapping can be performed simultaneously with taps of different pitch

The machine is set in motion by depressing a foot treadle at the right. This operates the belt shifting mechanism, moving the round leather driving belt which runs from the motor to the forward driving pulley. This sets in motion through bevel gearing at the rear a horizontal shaft which drives the main spindle of the multiple tapping head through gearing near the top of the machine column.

The tapping spindles in the head are crank driven, and are machined out of a solid alloy steel bar. They are all located on fixed centers in a phosphor-bronze spindle bearing, quickly removable from the machine to permit the insertion of other heads having the spindles arranged according to other layouts within a 5-in. circle. This makes it possible to tap other parts with the same machine.

In these tapping heads, each spindle is provided with a compensating arrangement which permits each tap to follow its own lead independent of any other tap, thus to insure that every hole is tapped with clean cut thread, free from drags or stripping even when working through thin soft brass, steel or other metal and with taps of small diameters. This feature, it is explained, also allows of tapping simultaneously with taps of different pitch and produces uniformly accurate and truly interchangeable work.

During the tapping operation the working table is progressingly raised at the same rate that the taps enter the work, until the taps have penetrated to the depth wanted, when an automatic trip operates shifting the round driving belt quickly over to the grooved reversing pulley, reversing the taps and lowering the table almost twice as fast as during the tapping advance. When the table reaches its lowest or loading and unloading position, the trip again shifts a round driving belt to the loose pulley when the machine stops. The upward and receding speed of the travel of the working table may be closely adjusted to correspond in each case with the pitch of the taps used and with the thickness of the work to prevent overtravel of the table, breakage of taps or spoiled work.

The Larson Anti-Friction Metal Co., Pittsburgh, has been merged with the Damascus Bronze Co., that city.

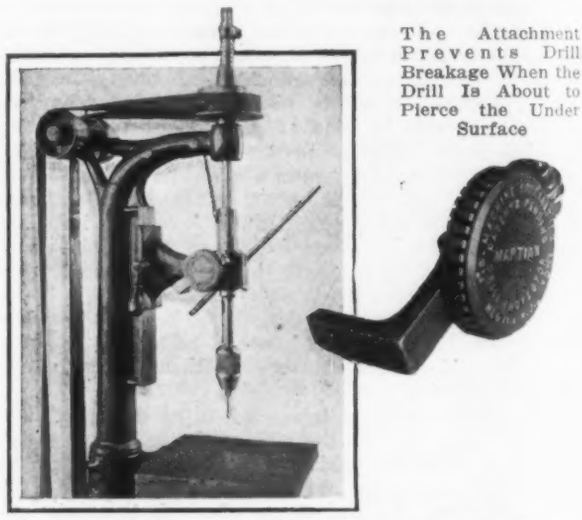
Detroit Company to Make Automotive Parts

The Detroit Machine Tool Co. announces the completion of a new building for the manufacture of automotive parts. The company now manufactures a semi-automatic drilling machine and centerless cylindrical grinding machine, and the latter machine is the nucleus of the new endeavor. Ten parts are to be manufactured, all of which call for centerless grinding operations, as well as occasional drilling. These include piston, valve roller, roller clutch, differential gear and straight dowel pins; straight push rods, oil pump plungers, roller bearing rolls, headless king bolts and short gear shafts. The new department will be run somewhat on the plan of the Gisholt shop course for foremen and operators, with special attention given to the teaching of visiting foremen in the rudimentary principles of centerless grinding.

The new building provides for a total floor space of 37,200 sq. ft., and is two stories, of concrete and brick construction, with liberal window sash. The parts manufacturing division will be in charge of H. J. Swanson, who will continue in the capacity of sales manager.

Drill Protector for Sensitive Drill Press

The Martain drill protector, an attachment for use in connection with sensitive or hand operated drill presses to save drill breakage caused by the drill being forced through the under surface of the work, is manufactured by F-S Machine Specialties, Inc., 171 Washington Street, Newark, N. J.



The Attachment Prevents Drill Breakage When the Drill Is About to Pierce the Under Surface

When the drill point approaches the under surface of the work, the resistance of the material rapidly breaks down, and unless the operator carefully feels his way through, the drill moves forward faster than the cutting edges can remove the metal, thus instead of acting as a cutting tool, the drill acts more like a screw. If the drill is small and the metal tough, the drill is often broken. The Martain attachment is designed to come into action just when the drill is about to pierce the under surface and prevents it from feeding too fast. When the protector is properly set, the operator, it is stated, can detect no change in the feel of the press as the resistance is shifted to the mechanism of the protector; he continues feeding normally until the drill is entirely through the article and the hole is complete.

The attachment is intended to prevent breakage of drills from ⅛ in. in diameter down to No. 60. The attachment, it is explained, is suitable whether the press is new or worn.

It is understood that the Norfolk & Western Railroad has definitely decided to build 1000 coal cars, of 120 tons capacity, to cost over $5,000,000. No contract for the construction of the cars has been let, and there is a possibility that they will be built in the company's own shops.

Plan to Encourage Buying by the Railroads

Congressman Winslow Proposes to Amend Transportation Act So as to Permit Government to Settle with Carriers—Causes of Present Conditions

WASHINGTON, Jan. 18.—With stimulation of the steel industry dependent to a large extent upon purchases by the railroads, unusual interest is manifested in settlements they may make with the Government of debts the latter owe the carriers as the result of obligations arising from Federal control and during the six-month guaranty period. The period of Government control continued for 26 months, from Jan. 1, 1918, to March 1, 1920, while the guaranty term extended from March 1, 1920, to Sept. 1, 1920, as provided in the transportation act. Difficulty has been experienced by the railroads in making settlement with the Government and, indeed, there is no clear understanding as to the credits to which the railroads are entitled. Already litigation has taken place over the matter of final settlements with the outcome, as the consequence of a decision by the Supreme Court of the District of Columbia, favorable to the Government which upheld a ruling by Controller of the Treasury W. W. Warwick. By this finding it was maintained that a balance of approximately $367,000,000 could not be paid to the railroads by the Treasury Department until a final settlement is made with the various railroads. That the withholding of this sum of money from the railroads is restraining purchases of steel and equipment generally goes without saying.

The Winslow Bill

In the absence of legislation, which is favored by the Interstate Commerce Commission, it is likely that settlement could not be made in some cases at least for two or three years, or much longer than the railroads could afford to wait. Consequently, great importance is attached to a bill introduced in the House of Representatives by Representative Winslow of Massachusetts to amend the transportation act so as to enable the Secretary of the Treasury to make payments upon the issuance by the Interstate Commerce Commission of certificates. Hearings on this bill were begun last Friday before the House committee on interstate and foreign commerce, of which Representative Esch of Wisconsin is chairman. It is believed that he will be succeeded as head of the committee by Mr. Winslow, ranking Republican member of the committee, with the advent of the Harding administration. It is hoped, however, to get the proposed legislation through both branches of Congress at its present session. In such an event it is thought that more active buying of equipment would be undertaken in the near future by the railroads, though their financial situation generally, it has been indicated, would restrain purchases on a normal scale. Moreover, railroad executives are hoping for lower prices of steel. Their purchases of rails for 1921 delivery, which involve about 2,500,000 tons, it has been noted, became more active after independents had adopted the Steel Corporation prices of $47 for open hearth and $45 for Bessemer rails. While the independent steel interests now carry Steel Corporation prices on all commodities, it is claimed that purchases in other lines have not been so active as they were with regard to rails because the latter were in more urgent need.

The Present Status

The fact remains, though, that final settlement with the Government is an important item in the matter of purchases. Because of the interest the trade naturally has in this, the status of this situation is herewith given. Definite figures are not available, and difference of opinion exists as to these obligations, but estimates near enough to actual data are at hand which give a clear idea of the financial relation between the Government and the carriers.

The position of the Government seems to be that at the end of Federal control it owed railroads about $50,000,000. The total guarantee payable to the railroads for their operation during the 26 months was approximately $1,950,000,000. Shortly after the period of control, the Railroad Administration estimated that it had paid about $1,375,000,000 and that of the balance of $585,000,000 all but $90,000,000 would be taken care of by offsetting sums advanced to the carriers by the administration for additions and improvements, including equipment purchased. Since that time, about $40,000,000 of the $90,000,000 has been paid, leaving only $50,000,000 due the railroads.

During the six-month guaranty period, March 1 to Sept. 1, 1920, the railroads operated at a deficit and the Interstate Commerce Commission estimated that the amount due the railroads to make up the operating deficit plus the guarantee of the six months was $634,000,000. Of this amount, $234,000,000 was paid to the railroads on certificates issued by the commission on or before Sept. 1. The estimated balance of $367,000,000 has been held up under the ruling of the Controller of the Treasury until final settlements can be made. Controller Warwick held that the language of the transportation act provided that partial payment only on account could be made during the guaranty period and that as soon as that period closed the Treasury could no longer make partial payments but must make final settlement, and much remains to be done before this can be accomplished. The Grand Trunk Western filed mandamus proceedings to compel settlement, and the case was tried in the Supreme Court of the District of Columbia with the result already indicated. The transportation act made specific provision for difficulty that it was anticipated the railroads would have in making expenses and made allowance for the probability of the amount due the railroads being greater than they asked for on certificates. A sufficient margin was left to warrant the Treasury Department in advancing $234,000,000. Completion of details as to obligations due the railroads rests upon work being done by the railroads, the Interstate Commerce Commission and the former Railroad Administration in preparing maintenance schedules. These were to have been finished by Dec. 31, but they involved so much detail that the railroads asked for extension of time. The Interstate Commerce Commission ruled that it would not grant any general extension, but would act upon individual requests as they were made and so far they have been granted.

The Revolving Fund

Aside from these obligations, another source of revenue from the Government available for carriers is through the revolving fund of $300,000,000 provided in the transportation act. The total of loans approved by the Interstate Commerce Commission as of Dec. 31 was $205,721,357 for the following purposes:

To aid in meeting indebtedness	$86,173,750
To aid in acquisition of equipment	41,385,870
To aid in making additions and betterments to existing equipment	17,291,294
To aid in making additions and betterments to way and structures to promote movement of freight train cars	60,870,443

The railroads up to last week had borrowed $171,000,000 as against the $205,000,000 the commission has approved as loans. The Treasury Department has been issuing loans rather promptly upon presentation of certificates from the commission. Of the total $300,000,000 from the revolving fund, $40,000,000 has been reserved temporarily to meet claims and judgments arising out of operations during the period of Federal control as provided also in the transportation

act. Additional loans aggregating $51,653,594 may be made on pending applications. This will leave $2,625,049 of the revolving fund available for further loans. There will be credits to the revolving fund, during the transition period, of interest and repayments of principal with respect to loans heretofore made, and these credits will be available for still further loans.

Final Settlement

While the matter of loans from the revolving fund has a bearing on purchases of equipment by the railroads, that of making final settlement of obligations due them from the Government is the more important and legislation looking to this end consequently has created much interest. Obviously, the availability of these credits is only a part of the program of the railroads, indefinite as it evidently is, with regard to making purchases, but it is an important item. Their general credit situation is a vital factor, both as to long term and current credits. The latter have shown a much less satisfactory condition than was expected. Hope had been entertained that greatly increased revenues would arise from higher freight and passenger rates, effective Aug. 26, 1920, but earnings of railroads in September were only 4.1 per cent. In October they were 4.5 and in December only 3.5. The general depression of industry necessarily was largely responsible for the poor returns made, but some railroad executives do not attribute the low returns solely to this and have indicated that some kind of a revision along more scientific lines will be necessary for tariff schedules.

The substance of the railroad's position as it exists to-day seems to be that there is no bright prospect of early buying of steel on a large scale unless final financial settlement is made soon, although there are some needs which are so pressing that a considerable volume promises to be taken in the not distant future. The board of directors of the Chamber of Commerce of the United States has adopted a resolution urging legislation such as that proposed in the bill of Representative Winslow. Not only is this desired that railroads may at once begin a buying movement but also in order that they can pay outstanding obligations, such as those owed car builders, coal operators and manufacturers.

Utilizing Waste Heat from Open-Hearth Furnaces

Conclusions from Tests with Waste Heat Boilers — Steam Turbine Vs. Electric Motor Drive for the Draft Fan

THE application of waste heat boilers to open-hearth furnaces was discussed in a paper by Thomas R. Tate, Perin & Marshall, consulting engineers, New York, at a monthly meeting at Philadelphia of the Association of Iron & Steel Electrical Engineers, 513 Empire Building, Pittsburgh. Most of the difficulties encountered, he said, have been due to insufficient or too much draft, lack of proper draft control, improper location of boiler with respect to stack and induced draft fan, and to the presence of numerous air leaks through the checker-work in the waste heat flues and in the boiler setting. All of these troubles can be overcome in new installations, but it is somewhat difficult to obtain the most satisfactory arrangement when a waste heat boiler is added to an existing plant.

The present installations, the speaker continued, comprise boilers of the fire tube type, horizontal water tube boilers and vertical water tube boilers. Each type has its respective advantages and disadvantages as is the case with standard coal fired practice, and some engineers have their preference, but in many cases the first cost of the installation and the maintenance charges determine the decision as to which type shall be employed; and the question of efficiency and per cent of rating developed is not always given the careful study it deserves.

The results obtained from numerous tests, Mr. Tate said, lead to the following conclusions and theories with regard to the waste heat boiler, as applied to the open hearth furnace:

"The design of the proper size and type boiler for any installation should be determined upon the basis of the weight of waste heat gases from any given size furnace and the tonnage rating of the furnace. This weight can be calculated from the amount of carbon content in the fuel and in the charge per ton of ingot steel produced and from analyses of the gases and their atomic weights. The averages of several tests with producer gas show values of CO_2 of from 12 to 16 per cent and of CO from zero to 0.6 per cent.

"The draft on the furnace generally varies from 1.3 to 1.5 in. of water. The draft loss through the waste heat flues depends to a great extent upon the length of the flues, number of bends, etc., but for average conditions and a gas velocity of 25 ft. per sec. 0.1 in. of water should suffice. The draft loss through the boiler varies from 1½ to 3 in. of water, depending upon the type of boiler and the area of the gas passage and accumulation of dust on heating surface. The induced draft fan should be of sufficient capacity to handle the volume of passing gases and furnish the desired draft.

"The temperature of the gases entering the boiler ranges from as low as 900 deg. Fahr. in some installations to a maximum of 1400 deg. Fahr. and varies considerably during a given heat. With a properly designed flue, and the boiler located within 20 to 30 ft. of the checkers, an average temperature of 1200 deg. Fahr. should be obtained at entrance to the boiler.

"Due to the fact that most of the heat transfer from the gases through metal heating surface to water comes from the principle of convection of heat and very little transfer is gained from radiation of heat, close attention must be paid to the principles promoting the efficiency of convection. These principles are general and basic and may be stated as follows:

"Close confinement of the gases to the heating surface; long gas travel; ample time for the gases to be in contact with the heating surface; gravity or mechanical cleaning of heating surfaces to insure greatest efficiency, and no possibility for the gases to short circuit the heating surfaces, regardless of velocity.

"The location of the boiler should be adjacent to the stack, on center line of the furnace. The fuel used may affect the arrangement slightly as it may eliminate part of the checker-work and vary the location of the waste heat flues.

"The waste heat flues should be designed to come directly from the checker-work to the boiler, with a by-pass around the boiler and fan and suitable by-pass valve. If underground, these should be protected against heat losses and air leaks by from three to four feet of earth. If overhead, they should consist of a steel pipe with a suitable firebrick lining.

"Induced draft is absolutely essential to the success of any scheme of open-hearth waste heat utilization. The fan, preferably of the steel plate overhung type, should be so located as to obtain ample draft at all times to move the gases generated through the boiler and minimize the length of passage from outlet to stack.

"The fan drive should be determined from the standpoint of draft control and feed water heating. Variable speed motors, constant speed squirrel cage induction motors, steam turbine drive or steam engine drive may be used with satisfaction.

"With variable speed motors, the speed and draft may be controlled from the melting platform. With constant speed motors it is necessary to use a damper, also controlled from the melting platform. With either a steam turbine or a steam engine, the speed and draft may be varied directly at the fan. The steam turbine

affords the most flexible method of drive and of course gives ample exhaust steam for feed water heating.

Auxiliary Apparatus

"Superheaters are a necessary adjunct of any power house and should not be omitted in any waste heat boiler installation. Their location should be such as to furnish the desired amount of superheat. Whether this be between the first and second passes, parallel to the first pass or located in the boiler entrance, should be determined for any given conditions and type of boiler used.

"The square feet of heating surface required for superheaters is approximately 10 per cent of the total square feet of boiler heating surface.

"Soot blowers are absolutely essential for the successful operation of any waste heat boiler containing a large amount of dust in the waste heat gases and should be installed regardless of the type of boiler selected.

"It is also advisable to have feed water regulators but the type selected should be unaffected by temperature changes as conditions very often necessitate locating the waste heat boiler outdoors."

The speaker concluded the paper with formulas for rough calculation for determining the horsepower which can be developed and the proper size boiler to be installed for the development of that horsepower.

Discussion

In a discussion of the paper, A. J. Standing, Bethlehem Steel Co., South Bethlehem, Pa., cautioned against "shortening the number of heats on the open hearth by putting a waste heat boiler on it. Approximately a 50 or 60 per cent credit does not balance the hourly delay in the heat, and that means with our boiler and fan we must produce a little better than stack draft. For instance, if your stack draft is 1 in. or 1¼ in., you must beat that with the waste heat boiler. Now, then, there are two distinct ways of doing it. One method is to use a vertical type boiler with as little resistance as possible. You simply pass your hot gases at an average of 1100 deg. in your vertical boiler with one down draft up to your motor. There, you do not use the larger percentage of your heat. Your hot gas is going into your boiler at about 1100 or 1200, and going into your stack at about 500 to 600.

"Another method is to put your gases in at 1100 or 1200, and take them out at 300 or 400 in order to get your draft through your boiler where you have a great deal more resistance in your path. You have to provide a larger fan and a much higher fan pressure, and that is the question that has come up in our plant, getting the furnace man to keep the boiler on the furnace. In other words, the minute they believe we are slowing up the furnace they shut the boiler off. By using a large fan we produce considerably more than stack draft continuously. At the present time we are using a high speed fan, and we have experienced a great deal of trouble with it. It vibrates and gets out of balance due to encrustation on the plate. I find in the Middle West they are going to turbines, and getting better results with slow speed geared turbine drive."

Draft Fan Drives

G. W. Richardson, American Bridge Co., Pencoyd Iron Works, Pencoyd, Pa., stated that they had been using turbines on their waste heat boilers. "We are just now making a change to electric drive. Our turbines are so wasteful that we think we can make a great gain by doing away with the turbines. Turbines give us a considerable lot of trouble, as they get out of balance. We contemplate putting on 35 or 50-hp. variable speed motors on the boilers, with the exception of one on which we will put on a larger motor. These boilers I refer to are Babcock horizontal. We get about 100 hp. out of our boilers. I do not know if this is the general practice or not. Our turbines consume about 50 per cent of the amount of steam we make. That is the reason we are trying to get away from them."

R. B. Gerhardt, superintendent Electric Department, Bethlehem Steel Co., Sparrows Point, Md., stated that it seemed that the "question of steam versus motor drive is to be determined principally as to whether we have some other good use where we can put that steam to. At Sparrows Point we have a great demand for steam for other purposes, and we generate power pretty cheaply from blast furnace gas. I find that we are using 75 horse motors on our waste heat boilers. They average about a 70 hp. load. If that were changed to a steam drive, we would use more than likely as much as 15 per cent of the boiler rating for the blowers, instead of the 12 per cent which Mr. Tate said was about his average figure.

"Now with the motor drive, considering the current for that motor would have to be developed in a fairly medium size machine from steam, may I say we could assume 15 lb. per kw.hr? That might be cut in half. In other words, we find it in our particular case considerably cheaper to operate the blowers with motors and use the steam for some other purpose where it is more valuable to us. For the month of March, on three furnaces operating the full month, and one operating eight days out of the month (this one being used in connection with a 200-ton tilting furnace) our average boiler hp. per hr. in those units was 465. The boilers were installed as 450-hp. units, B. & W. boilers, steel casing, and I think about what you would call modern practice."

In reply T. R. Tate said that "a good non-condensing turbine has a water rate of about 31 to 33 lb. per hr. and it is true, if you look at it from the basis of a 15-lb. modern steam turbine, that you would be saving 15 per cent of the steam generated; but my own argument in favor of the turbine drive is that the exhaust steam is used for heating feeder boilers."

Relative to motor drive, G. W. Richardson stated that the trouble with motor drive is that the motors are generally put on too small. "They lay out a certain speed to run, and the first thing the superintendent comes along and wants 100 or 200 revolutions faster, and then your motor is overloaded. I think that has been mostly the practice with putting motors on. I believe the motor should be variable speed for the purpose of permitting the superintendent to vary the speed according as he wants it."

Magnetic Analysis of Twist Drills

WASHINGTON, Jan. 18.—To make it possible to test twist drill by magnetic analysis, the Bureau of Standards is taking part in a co-operative investigation that is now being carried on by a committee of the American Society for Testing Materials. The steel has been specially prepared by one member of the committee and tested for homogeneity by a magnetic method at the Bureau. The drills are to be manufactured from this steel by another member of the committee under carefully controlled conditions, after which they will be tested again magnetically by various members of the committee Following the magnetic tests, the drills will be returned to the manufacturer, who is to give them a thorough mechanical test. The committee will then meet and attempt to correlate the mechanical performance of the drills with the results of the magnetic tests. The ultimate object of this investigation is the development of apparatus which can be used in a commercial way for the non-destructive testing of twist drills. The special apparatus for this work is in process of construction at the Bureau.

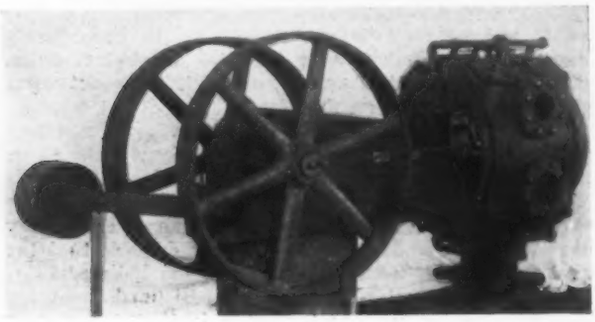
The Stocker-Rumely-Wachs Co., 17 North Jefferson Street, Chicago, has taken the exclusive agency in the Chicago district for the cylinder grinders of the Madison Grinding Machine Co., Madison, Wis. The manufacture and marketing of these cylinder grinding machines was recently taken over by the Gisholt Machine Co., Madison, Wis.

The Smith-Totman Co., Chicago, and not the H. W. Johns-Manville Co., Chicago, furnished the insulation for the steam piping at the blast furnace plant of the St. Louis Coke & Chemical Co., described in THE IRON AGE of Jan. 6, page 35. The H. W. Johns-Manville Co. supplied the insulation for the hot blast mains and the bustle pipe.

Air Compressors and Vacuum Pumps

The Pennsylvania Pump & Compressor Co., Easton, Pa., organized in March, 1920, is now manufacturing air compressors and vacuum pumps which have a number of interesting features. Inclosed dirt-and-dust proof construction providing for a splash lubrication system for the driving parts is employed. It is explained that usual practice, in order to keep the oil from this splash lubrication system out of the air cylinder, is to provide a partition in the main frame, carrying an extra stuffing box, but due to the fact that the bored guide type of crosshead is used in the Pennsylvania compressor, more completely filling the guide portion of the compressor frames and supplemented by a baffle plate placed ahead of the crosshead, it has been possible to eliminate this partition and stuffing box, simplifying the need for attention to that extent. An oil float gage indicates the level of oil in the basin.

A forged crank shaft operates in removable bronze



main bearings thus making for quick adjustment and replacement. The use of a forged crank shaft has permitted the employment of a solid box at each end of the connecting rod, the eye of the connecting rod being slipped over the crank shaft and the adjusting gibs and wedges inserted in place.

The fly wheels are mounted on the tapered ends of the crank shaft and are keyed and held in place by a washer and cap bolt, thus eliminating split hub fly wheel construction. The taper construction, it is explained, keeps the fly wheels running true at all times.

The ring plate type of valve which is guided on the outside in place of inside the valve is used. This, it is stated, makes it impossible for the valve to cock in operation.

Both air compressors and vacuum pumps are of the same general construction, excepting that the air cylinder of the vacuum pump is of considerably greater diameter for the same stroke size, and the position of the valves are reversed. That is, where the discharge valves are at the top in the air compressor, they are placed at the bottom in the vacuum pump. The machines are built both power and steam driven. The steam driven type has a balanced piston valve steam end.

New England Foundrymen's Association

The New England Foundrymen's Association held its twenty-fifth annual meeting at the Exchange Club, Boston, on the evening of Jan. 12, 190 members and guests attending. At a business meeting held previous to the dinner A. B. Root, Jr., retiring president, presided. The reports of the secretary and treasurer were accepted; the Rhode Island Crucible Steel Co., Providence, R. I., was admitted to membership, and the following officers were elected for the ensuing year:

C. S. Lovell, the Walker-Pratt Mfg. Co., Watertown, president; E. H. Ballard, General Electric Co., West Lynn, vice-president; George H. Gibby, Gibby Foundry Co., East Boston, treasurer; Fred F. Stockwell, Barbour-Stockwell Co., Cambridge, secretary; executive committee: Charles A. Reed, Reed, Fears & Miller, Boston; George A. Ray, Taylor-Fenn Co., Hartford, Conn.; L. M. Sherwin, Brown & Sharpe Mfg. Co., Providence, R. I.; Harry T. Welch, Milford Iron Foundry, Milford, Mass., and John Busch, Chapman Valve Co., Springfield, Mass.

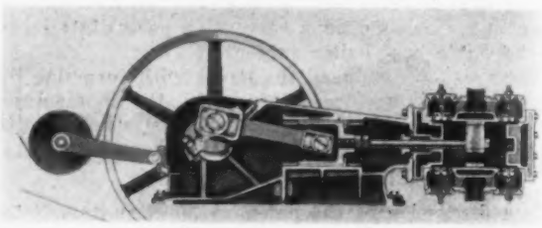
Mr. Stockwell's election marked his twenty-fifth term as secretary.

Following the dinner a vaudeville show was enjoyed. Charles A. Reed was chairman of the entertainment committee.

Temper Brittleness of Steels

WASHINGTON, Jan. 18.—The Bureau of Standards has issued a summary covering an extensive review of the literature on the temper brittleness of various types of steels. This summary, which covers the investigations made by the Bureau itself as well as the research work of the other experts, follows:

Certain steels which have been hardened by quenching from temperatures above the A_3 point and tempered at temperatures ranging from about 450 to 600 deg. C. show less impact values if they are cooled slowly after tempering temperature as compared with those cooled quickly. The cause of this phenomenon, which is also referred to as "Krupp Krankheit," has not yet been clearly established.



The Usual Partition and Stuffing Box, Used in Air Compressors and Vacuum Pumps Which Employ the Splash Lubrication System, Are Eliminated in This Design

The property of temper brittleness has been found present in carbon steels 0.25 to 0.40 per cent carbon, nickel, chrome-nickel, chromium, and certain other alloy steels. Chrome-nickel steels of the same chemical composition and heat treatment have been found to vary widely in their susceptibility to temper brittleness and even in the opposite direction, i.e., the slowly cooled specimens were tougher than the quickly cooled ones.

The process of manufacture appears to have more of an influence than small changes in chemical composition. Thus, steels made by the acid open-hearth process are more prone to temper brittleness than electric or crucible steels. The opinion has been advanced that the degree of work and the temperatures employed during the process of fabrication from the ingot bear some relation to the degree of susceptibility to temper brittleness. Other factors appearing to have an influence are the temperature of hardening preceding tempering treatment, degree of hardening, as cooling in water, oil or air, the rate of cooling from tempering temperature, phosphorus content, and the furnace atmosphere in which the material is treated. Other questions bearing upon the problem and upon some of which no general agreement has been reached and concerning which but little knowledge appears to be available are: Relations between microstructure and susceptibility to temperature brittleness, path of rupture, and tensile test values, as well as the Brinell hardness values, and tensile test values as well as the Brinell hardness values, and the influence of the shape of the notched specimen upon impact test values.

Philadelphia Foundrymen Elect Officers

The Philadelphia Foundrymen's Association, at its annual meeting, Jan. 12, re-elected Thomas Devlin of the Thomas Devlin Mfg. Co., Philadelphia, president, and George C. Davies, Pilling & Co., vice-president. Howard Evans was re-elected secretary. The position of treasurer was filled by the election of W. G. Summers, the Phoenix Iron Co. Members of the executive committee are as follows: Walter Wood, R. D. Wood & Co.; Frank Krug, White & Brother, Inc.; Frank Hodson, Electric Furnace Construction Co.; Walter T. MacDonald, Fletcher Works, Inc.; W. T. Dunning, Chester Steel Castings Co.; J. Howard Sheeler, Sheeler-Hemsher Co.

The Federal Machinery Sales Co., 12 North Jefferson Street, Chicago, has taken the exclusive agency for the line of disk grinding machinery manufactured by the Gardner Machine Co., Beloit, Wis. The Gardner company has closed its sales office on Clinton Street, Chicago.

Makes Plea for Crucible Steel Industry

Dr. John A. Mathews Appeals to Ways and Means Committee for Better Protection—Automobile Manufacturers Ask for Reduction of Duties

WASHINGTON, Jan. 18.—Manufacturers of steel products of various kinds appeared before the House ways and means committee during the past week in connection with the hearings on general tariff revision. Three days were devoted to Schedule C applying to metals and manufactures of metals.

In most cases the manufacturers sought higher duties as a means of protection from foreign imports. In marked contrast to the general attitude was the position of the automobile manufacturers who sought a reduction in import duties on their own product. This position was taken by automobile manufacturers with the idea that such action would aid in the development of foreign markets. The automobile men said that other nations, notably France, have shown a disposition to impose high duties upon American automobiles corresponding to the duty existing in the United States against foreign cars. A system of reciprocal policies was advocated under which penalties would be provided in case other nations did not maintain the same low duties as this country.

The specific request of the automobile manufacturers was that the present ad valorem rate of 45 per cent on automobiles valued at more than $2,000 be reduced to 30 per cent. Automobiles valued at less than $2,000 now come in at a 30 per cent rate.

Besides seeking a reduction in duties on automobiles the automobile manufacturers opposed a suggestion that the present duty of 2c. per pound on aluminum be increased to 7c. per pound. It was stated that if prices of aluminum go up any further it will be necessary to seek a substitute for that commodity. Keeping the price as low as possible was advanced as a step toward broadening the market for American automobiles.

It was declared that any increase in duties on automobiles will be disastrous to foreign trade. The manufacturers do not fear foreign competition in the United States, taking the position that no other country can compete with them in the manufacture of low priced cars.

Tungsten and Magnesite

The tungsten and magnesite interests did not make any effort to present their case to the committee at this time. They took the position that inasmuch as extensive hearings were held on the proposition last winter as a result of which bills were passed by the House and are now pending in the Senate, it was useless to go over the ground again. It is considered a certainty that the new tariff law will include provisions for the protection of the tungsten and magnesite industries developed during the war similar to those in the emergency bills now in the Senate.

One witness appeared, however, in opposition to the proposed protective duties on tungsten, Frank P. Harris of the Harris Laboratories, New York, who said he was interested in tungsten alloys in Portugal where his investment has been a total loss because of inability to market the product. Mr. Harris declared that the proposed duty of $10 a unit on tungsten is prohibitive and that the benefits of the duty would be confined principally to three producers in Colorado and California and that it would benefit only a few laborers. The greatest benefit, he claimed, would come to the British manufacturers through their ability to manufacture tools requiring tungsten more cheaply than manufacturers in the United States. The British manufacturers, he declared, would be able to get their tungsten much more cheaply than American manufacturers and in consequence Great Britain would control 80 per cent of the tungsten products industry of the world.

One producer of manganese, which is on the free list, appeared before the committee to ask protection. Walter H. Dennison of Cushman, Ark., said that a duty on manganese such as desired would increase the price of a ton of steel only 24¾c.

The Crucible Steel Industry

Dr. John A. Mathews, president Crucible Steel Co. of America, Pittsburgh, appeared on behalf of the crucible steel industry. Dr. Mathews had had a conference with Charles M. Brown, vice-president Colonial Steel Co., Pittsburgh; Roy McKenna, president Vanadium Alloys Steel Co., Latrobe, Pa.; J. H. Parker, vice-president Carpenter Steel Co., Reading, Pa., and H. A. Pardee, vice-president the Holcomb Steel Co., Syracuse, N. Y.

Dr. Mathews said that the portion of the steel industry known as the crucible steel or fine steel industry, which represents about one-half of one per cent of the tonnage and possibly two per cent of the value of the entire industry, is more seriously affected by imports from various European countries than other branches of the industry. He said that a reclassification which will give greater protection to this branch of the industry, which involves expenditure of the greatest amount of labor, the use of the most expensive raw materials and alloys, and the investment of larger capital per ton of output than is required in the manufacture of soft or commercial steel, is desirable.

Manufacturers Represented

Among various manufacturers of steel products who appeared before the committee to ask for protective duties were William J. Smythe of the American Screw Co., Providence, R. I., on behalf of manufacturers of wood screws; W. F. Duffy of the Latch Needles Manufacturing Association, and various representatives of other kinds of needle manufacturers; K. H. Nilsson on behalf of the gas engine manufacturing industry; H. L. Henry of the Geneva Cutlery Co., Geneva, N. Y., on behalf of the cutlery industry; A. C. Carlton of the Universal Steel Products Co., San Francisco, representing the American Piercing Saw Manufacturers' Association; Edward J. Sovatkin of Brooklyn, N. Y., representing the surgical instrument makers of America; J. M. Roberts of Chicago, secretary the Central Scientific Co., representing the scientific instrument industry; Wallace L. Pond, Providence, R. I., representing the Nicholson File Co. and other file manufacturers; M. G. Steinhardt, New York, representing the American Steel Wool Manufacturing Co.; C. L. Gairoard, representing J. Wiss & Co., Newark, N. J., and other manufacturers of scissors; L. Livingstone, New York; representing the lighting fixture manufacturing industry; J. H. Kann, Pittsburgh Crushed Steel Co., representing manufacturers of steel shot and crushed steel; T. H. Ringrose, International Casement Co., Jamestown, N. Y., manufacturer of steel window casements; A. E. Ballin, McIntosh & Seymour Corporation, Auburn, N. Y., manufacturer of Diesel engines; C. A. Tonn, Great Western Mfg. Co., La Porte, Ind., and J. P. Fogarty, Westfield Mfg. Co., Westfield, Mass., representing manufacturers of bicycles; J. Henry Longmaid of the Esterbrook Steel Pen Mfg. Co., Camden, N. J., representing five pen manufacturers; J. D. Hallowell, De Laval Separator Co., Chicago, representing a number of separator manufacturers; H. W. Baer, representing makers of metal buttons, and A. C. Morrison, Electro-Metallurgical Co., New York, representing the ferroalloy industry.

Dr. Mathews' Statement

The text of the statement presented by Dr. Mathews on behalf of the crucible steel industry follows in part:

"The crucible or fine steel industry is essentially a

handcraft industry. A large amount of skilled labor is employed, while in the tonnage industry the output is the result of a relatively small amount of skilled labor operating highly specialized machinery.

"There are in this country 40 individual plants engaged in the manufacture of crucible or fine steels. Some of these plants also use the electric furnace process, and some use both crucible and electric. In other instances open-hearth products are subjected to processes in finishing which entail the use of high grade skilled labor coupled with low production. These specialty products of fine steel, as has been said, represent a small tonnage, a high initial investment, and the employment of much labor. The output per man per month in this industry may be considered as not over one ton. In the tonnage industry the production per man per month would be from 25 to 35 times as much.

"In order to assist the ways and means committee in the preparation of a new and more equitable tariff act, we will submit later in this brief some proposed changes which would tend to differentiate the fine steel products from the tonnage steel products, hoping that they will be given protection somewhere nearly in proportion to the amount of skilled labor involved.

The Tariff of 1909

"Under the tariff act of 1909 the crucible steel industry was not as well protected as was the cheap or tonnage steel trade. Taking an import of 4c. per lb. as the dividing line between the two trades, we find from custom house records that steels valued below 4c. per lb. were subject to from 30 per cent to 35 per cent duty, while steels valued at over 4c. per lb. were subject to only 20 per cent duty. That this was unfair to the crucible or fine steel industry was apparently conceded by the committee which prepared the tariff act of Oct. 3, 1913, for, while general cuts were made in all lines, an attempt was made to better the classification of steel products as contained in the act of 1909, with the result that the committee decided upon a 10 per cent ad valorem duty upon the tonnage steels and a 15 per cent ad valorem duty upon products representing greater refinement and greater expenditure in labor and materials.

"It is difficult to give the amount of investment in the crucible or fine steel industry because of the fact that many of these plants represent departments of large mills making tonnage steels, and relatively few of them are entirely and exclusively devoted to the production of high grade steels. We would estimate, however, not less than $350,000,000 of invested capital. We may also state that the country possesses ample capacity, equipment and skill to take care of all of its requirements for high grade steels and specialties. There are employed from 30,000 to 40,000 men in our branch of the industry. Since the signing of the armistice some six or eight companies have either curtailed or totally discontinued operations.

Reasons for Reclassification

"The special reasons we would advance for a reclassification of steel products which would distinguish between those of the fine steel industry and those of the tonnage steel industry are as follows:

"First—The proportion of labor to raw materials is many times as great in manufacturing crucible steel as it is in the manufacture of open-hearth or Bessemer steel. We may illustrate this condition as follows:

"In the production of pig iron about 6 per cent of the cost goes to direct labor.

"In the production of, say, 1-in. round merchant bar of open-hearth steel, starting from pig iron, from 20 per cent to 25 per cent of the cost represents labor, and from 80 per cent to 85 per cent of the cost represents materials.

"In the cost of a 1-in. round bar of crucible tool steel 60 per cent to 65 per cent goes to labor, exclusive of selling and administrative expense, while if this same material were still further reduced to the form of fine wire, such as needle wire, or small sizes of drill rods, labor would get from 85 per cent to 90 per cent of the cost.

"Second—The capital invested in the crucible steel business is from five to six times as great per ton of product as is necessary for mills making merchant bars, structural steels or rails. The investment in the latter, depending upon the nature of the plant and equipment, might run from $32.50 to $75 per ton of output, while in plants making tool and high-grade steels exclusively this investment is customarily from $300 to $400 per ton.

"Third—It is in proportion to the increased amount of labor involved that imports of steels increase and exports decrease. While as has been shown, the total value of crucible or fine steels is only 2 per cent of the whole steel business, yet there has been imported under the tariff act of 1909 and 1913, three or four times as much steel in value, of the kind represented by our industry, as was imported in the grades of steel produced in the heavy steel lines of industry which represent over 98 per cent of the total value of the country. The portion of imports affecting the crucible or fine steel industry has paid from 70 per cent to 75 per cent of the total duties collected. It is apparent, therefore, that European makers cannot compete successfully with our abundant natural resources but can and do compete injuriously with our labor in this handcraft industry.

"As regards exports, we know that these have averaged over $1,000,000 per day in tonnage lines over fairly long periods of time, while the exports of crucible or fine steels are not over one-half million dollars per year.

"There has been much adverse comment on the subject of selling abroad cheaper than at home. With tonnage steels this is possible. With crucible steels it is impossible, unless they were sold below cost. Such fine steels as are exported are specialties and in general bring as much abroad as they do at home. 'Dumping' of crucible steels abroad is impossible and in time of decreased domestic markets we have no outlet abroad, but rather a more extensive competition at home.

"Under these adverse conditions the American crucible steel industry has been almost at a standstill for 15 years, during which time the open-hearth tonnage of the country has increased some 600 per cent. The classification of steel products under the tariff act of 1909 and 1913 is not as well done as it was in the Dingley act of 1897, and the rates of duty have declined at each tariff revision since the act of 1897. This decline is possibly justified in the case of products not involving excessive investment and labor costs. Excluding the period of the war, exports of tonnage steels exceeded the imports by more than ten to one, while imports of crucible or fine steels exceeded the exports by nearly the same ratio. The reason is apparent from the above explanation of fundamental differences between the tonnage steel business and the quality steel business, yet these differences have been given scant consideration in the construction of our tariff laws.

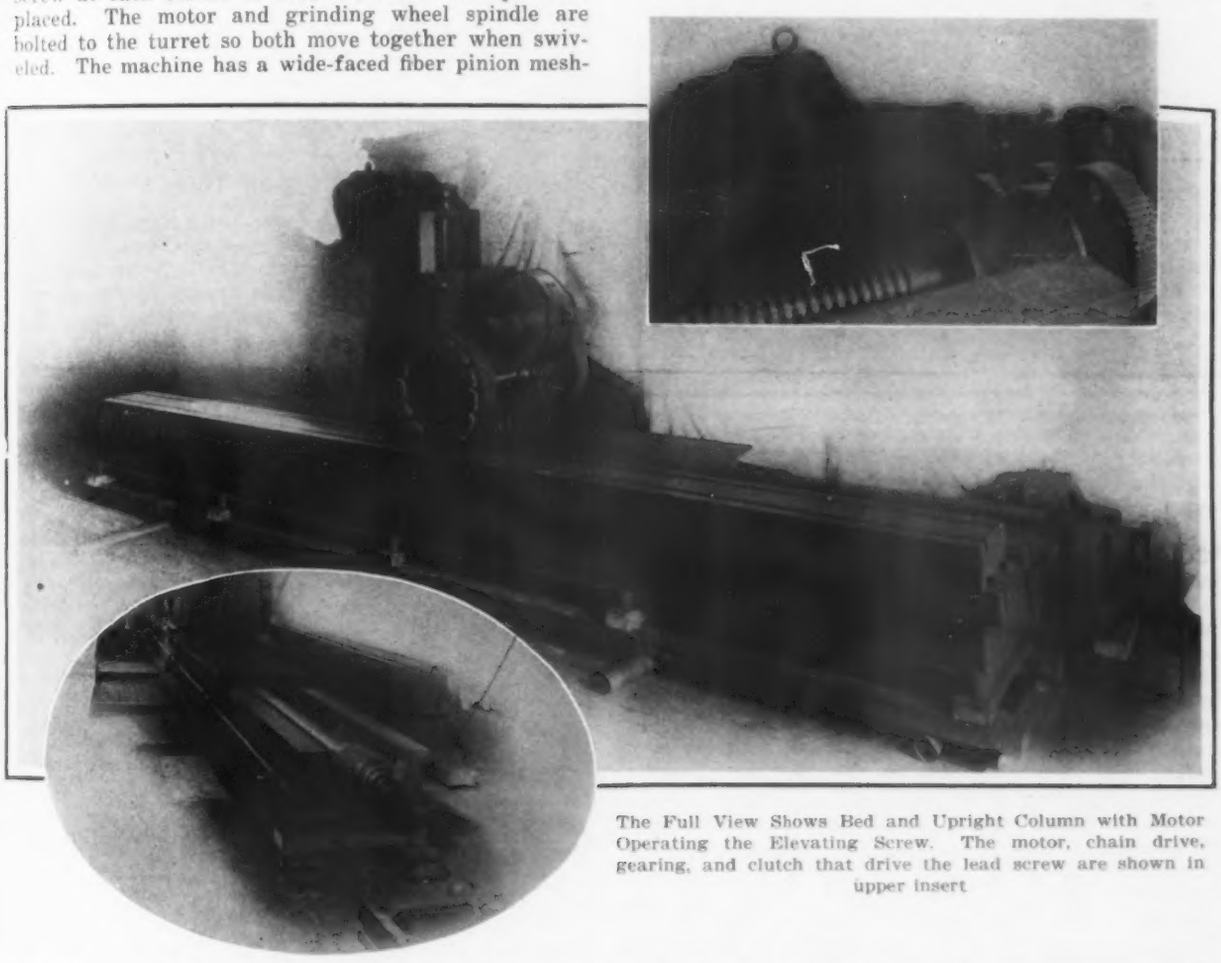
"An equitable degree of protection for the labor and capital in this industry would be secured by a scale of duties ascending with the import valuation. The higher the import value the higher should be the rate of duty, because almost without exception the increased valuation of steel is due to the additional proportion of labor represented in its production."

Daniel C. Roper, president Marlin-Rockwell Corporation, formerly U. S. Internal Revenue Commissioner, will be the principal speaker at the annual banquet of the Engineers' Society of Western Pennsylvania, to be held Monday evening, Jan. 24, at William Penn Hotel, Pittsburgh. Other speakers include James A. Emery, counsel for National Industrial Council, and Ellis Parker Butler, humorist. Arthur W. Thompson, president of the Philadelphia Co., will be toastmaster. The committee in charge comprises H. D. James, chairman; Allen S. Davidson, S. W. Dudley, T. C. Schatz and E. C. Wayne.

Of the industries at Niles, Ohio, the Youngstown Steel Car Co. is maintaining the best record of operations by reason of car repair orders received from the railroads. Orders placed with the company insure the continuance of operations for several months.

Motor-Driven Face Grinder

An edge grinder with bed 30 ft. long, to grind work 24 ft. long and known as No. 152 face grinder, is a recent development of the Bridgeport Safety Emery Wheel Co., Bridgeport, Conn. The machine is designed to be set on mason work to form a solid foundation. The bed has flat top rails, 6 in. wide, over which a short carriage is traversed, gibbed to take up for wear. A heavy column mounted on the bed has one upright face finished with wide, flat tracks and a carriage, gibbed, with 2 in. elevating screw for up and down movement of the grinding wheel. On this carriage there are crosswise or horizontal tracks carrying a carriage for feeding the wheel to the work, operated with a screw 1½ in. in diameter and a 14-in. hand wheel. On top of the last-named carriage there is a turret pivoted at the center so as to grind the work square across or at an angle, with clamping screw at each corner to hold the turret firmly where placed. The motor and grinding wheel spindle are bolted to the turret so both move together when swiveled. The machine has a wide-faced fiber pinion meshing into a gear about twice its diameter on the back end of the grinding wheel spindle, so it is backgeared about 2 to 1. The wheel spindle runs in ball bearings with end thrust ball bearings each way, adjustable endwise for wear.



The Full View Shows Bed and Upright Column with Motor Operating the Elevating Screw. The motor, chain drive, gearing, and clutch that drive the lead screw are shown in upper insert

The grinding wheel is made up of sectional blocks forming a wheel 32 in. in diameter, 8 in. deep, with cutting rim 4 in. thick, composed of 14 sections with an open space between each section for material ground off to work into.

A motor on top of the upright column operates the grinding wheel head up or down through spur and worm gears, backgeared down to a practical speed for the elevating screw. A shifting lever operates the gears to move the wheel head up or down as desired. A cast iron guard covers the gears on motor and grinding wheel spindle. There is a 5 in. lead screw through the center of the bed its entire length, connected at left hand end to 7½-hp. motor at 1150 r.p.m., driving by chain and a train of spur gears. There is in this train a toothed clutch operated by a shifting lever to revolve the lead screw in either direction to make an automatic traverse of the wheel by the work. The lead screw runs in radial ball bearings at both ends and also has end thrust ball bearings on each side of the box at the right hand end of the lead screw, with adjustments for wear. There are several supports under the lead screw, between the end bearings, to prevent the screw from sagging.

On the front side of the column at the bottom is a stop that comes in contact with the shipping dogs for automatically reversing the traverse of the column. These dogs are on a shipping bar extending the full length of the bed, supported at about five points, and two shipping dogs between each bar support, pivoted so they can be thrown back quickly out of the way and only two of them used as required to cover the range of travel desired.

There is a work supporting bed the length of the machine, with working face 18 in. wide, having two T slots full length bolted to the bed of the machine; the work is bolted to this bed so the face to be ground comes in contact with the grinding wheel. If the work extends back from the table to any great extent it should be supported by suitable horses. A full length supplementary table 10 in. deep is provided to go on the work table when small pieces or sheet stock is to be ground.

The Mechanical World Year Book for 1921, issued by the *Mechanical World*, Manchester, contains 328 pages of engineering information, a diary for 1921 and 320 pages of advertisements. An extended classified buyers' directory adds to the utility of the advertising pages, and each classification, made in English, carries with it also the equivalents in French, Russian and Spanish. The book is in its thirty-fourth year, and its new sections include one on cast tooth gearing and one on ball and roller bearing, and the matter on chain gearing has been rewritten and extended. The pages are 4 x 6 in. in size and the book is published by Emmott & Co., 65 King Street, Manchester, England.

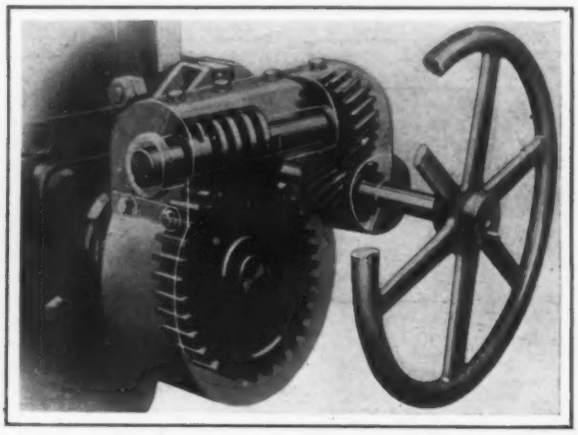
Charles B. Cook, vice-president and general manager Royal Typewriter Co., Hartford, Conn., states that production increased 12½ per cent following the laying off of less than 100 employees.

Helical Worm Geared Crane Ladle

A helical worm geared crane ladle has been placed on the market by the Whiting Foundry Equipment Co., Harvey, Ill. The distinguishing feature of this new ladle design is the mounting of the gearing on the trunnion instead of on the bail, thus to eliminate interference with the alignment of the gears by any distortion of the bail or bowl. The manner in which the gear bracket engages the bail is shown in the accompanying illustration.

A further advantage of this arrangement emphasized is that the gear alignment is not affected by wear on the trunnion journals.

It is explained that this gear combination has the self-locking feature of worm gearing but by virtue of the balanced thrust obtained through the helical gears, and the efficiency obtained by this type of gearing, the power required to rotate is less. The helical gear on the hand wheel shaft meshes with a helical gear on the worm shaft which is placed at an angle so that the worm will properly mesh with the large straight-toothed gear keyed to the trunnion. The large straight-toothed gear is of cast steel; the worm and helical gears are forged steel. All gears have machine cut teeth. The construction of the gear case is such that it will accommodate several different ratios of helical gears, depending on the speeds desired. Gearing is completely inclosed in a dust-proof cover but is readily accessible for inspection. Small oil cups with spring caps provide lubrication.



Gearing for New Whiting Crane Ladle Is Mounted on the Trunnion Instead of on the Bail

Freight Rates to and From Canada

WASHINGTON, Jan. 18.—Plans for avoiding friction regarding freight rates to and from Canada as the result of the low value of Canadian currency when expressed in terms of American money may be worked out by the Canadian railroad commissioners in conjunction with the Interstate Commerce Commission. In a telephone talk on Jan. 12 with Chairman Clark of the commission, Commissioner Cartwright of the Dominion commission suggested that the two bodies act in such a way that where the rates are published as joint undertakings the divisions received by each will be disclosed so that the shipper who is interested will know what part should be paid with American money and what part with Canadian.

Another phase of the subject relates to the amount of the war tax that shall be paid by Americans and by Canadians, if the latter are supposed to pay any tax to their government. It is understood that American shippers generally have been required by the railroads to pay a tax on the total freight bill to or from Canada, regardless of whether the tax was due on the part of the total bill representing the transaction in Canada.

Following the talk between Chairman Clark and Commissioner Cartwright announcement was made from Ottawa that a solution had been found whereby shippers of the United States were to pay for the Canadian part of the haul in Canadian funds and for the American part in currency of the United States. Full support of the announcement was not forthcoming from the office of Chairman Clark. It is held to be plain, however, that if the Canadian commission requires the Canadian roads to disclose what part of the money derived out of a joint rate is received by them, the consignee in the United States can know that the remainder of the money is received by the American carrier and act accordingly.

Prices of Farm Products and Machinery

Generally speaking, the products of an acre of agricultural land will purchase as much farm machinery to-day as in 1914, according to the estimates made at a meeting of the executive committee of the National Implement and Vehicle Association at Chicago on Jan. 13. From 1914 to April, 1920, farm products advanced 138 per cent, as against an increase in implement prices of only 92 per cent. It is stated that a general reduction in farm machinery prices can be made only as replacement costs are reduced, whether materials are on hand or must be purchased. Agricultural machinery manufacturers are operating at about 75 per cent of capacity in anticipation of actual orders, being confident that farmers needing equipment will buy when their requirements become pressing.

New Cutting-off Tool

A cutting-off tool which has a cutting circumference of over 300 deg. has been developed by the R. G. Smith Tool & Mfg. Co., 315 Market Street, Newark, N. J. It is for use in the company's special holder, which was developed for use with radius cutting tools, described in THE IRON AGE, issue of Sept. 23, 1920, page 778.

The cutting tool is designed so that the clearance is always maintained throughout the entire cutting circumference. This is accomplished by gradually thinning or tapering down the cutting edge, giving the tool ample side clearance rake. The tool, it is explained, is of special value for use in automatic screw machines and turret lathes, as well as in hand lathes. As rapidly as the cutting edge becomes worn, it can be ground away from the top and a new cutting edge restored. Ordinarily the tool is included as a part of the company's radius lathe and planer tool sets.

Cutting-Off Tool with Cutting Circumference of Over 300 Deg. As the cutting edge becomes worn, it can be ground away from the top and a new cutting edge restored

The December payroll of $7,861,830 at Youngstown, Ohio, comparing with $8,707,255 disbursed in November, reflects the lessened activity in the iron and steel industry, which in the meantime has become more pronounced. The 1920 wage distribution of $95,247,736 is, however, the largest in the history of the industry in Youngstown. The largest previous 12-month disbursement was $84,393,688, paid in 1918. In 1919 the sum of $81,891,279 was distributed to workers in the form of wages. The record monthly disbursement for 1920 was in November.

The purchase of property at 1437-59 (new numbers) Franklin street, Detroit, will enable the Detroit branch of the Crucible Steel Co., 1326 (new number) East Woodbridge street, to have twice its present warehouse space. The removal will be made by Feb. 1.

Chicago Steel Plants Reduce Wages

Inland Steel Co. and Steel & Tube Co. of America Return to Schedule of 1918—Many Other Employers Take Similar Action—Organization Plans for Steel Workers Announced

THE Inland Steel Co., Indiana Harbor, Ind., and Chicago Heights, Ill., and the Steel & Tube Co. of America with plants at Indiana Harbor, Ind., South Chicago, Evanston, Ill., and elsewhere, have reduced the wages of common labor to 38c. per hour, with time and one-half for overtime above eight hours. The scale is the same that was in force in this district from April to August, 1918. Until recently the Inland Steel Co. operated with three 8-hour shifts and paid 58c. per hour and no overtime. The Steel & Tube Co. of America was on the same basis as the United States Steel Corporation plants, paying 46c. per hour with time and one-half for overtime, an average of 50.6c. for men working 10 hours.

Sheet Mill Wages

Wages of sheet mill workers will be reduced 9½ per cent for the January-February period, from the rate prevailing the previous two months, as a result of the bi-monthly examination of sales sheets covering shipments for the 60-day period ended Dec. 31. Wages of tin mill employees remain unchanged. A substantial decline took place in the average invoiced selling price of Nos. 26, 27 and 28 gage plain sheet steel, the settlement disclosing a card rate of 5.15c., as compared with 5.80c. at the previous settlement. The settlement means a reduction of 19½ per cent in the base wage rate, though sheet mill employees will still be paid 90 per cent above base.

For the seventh consecutive bi-monthly period, the price of tinplate was disclosed at $7.75 per base box, and wages of tin mill workers will be unaffected, remaining at 95% per cent above base.

The examination was conducted Jan. 11 at Youngstown, Ohio, between representatives of the Amalgamated Association of Iron, Steel & Tin Workers, headed by President M. F. Tighe, Pittsburgh, and the Western Sheet and Tin Plate Manufacturers' Association. It did not reflect the full decline which has taken place in the sheet steel market. Whereas the product has declined 16 per cent in price, wages have not as yet dropped more than 10 per cent.

Wages are governed by the sliding scale of the Amalgamated Association, and rise or fall at the rate of 1½ per cent for each 5c. change per 100 lb. in the selling price.

The average card rate for sheets in 1920 was 4.40c. for January-February sales; 5.05c. for March-April; 5.45c. for May-June; 5.65c. for July-August; 5.80c. for September-October, and 5.15c. for November-December.

Unionization Plans Announced

WASHINGTON, Jan. 18.—With a fund of $75,000 inherited from the 1919 steel strike, the reorganized "organization committee" of 14 of the unions that conducted that controversy has decided to renew its "unionization" plans for the steel industry. The committee, which is now headed by M. F. Tighe of Pittsburgh, president of the Amalgamated Association of Iron, Steel and Tin Workers, met in Washington last week, and announced that it would begin its operations early in the spring. The presence of Mr. Tighe in the place of the radical John Fitzpatrick of Chicago, promises a more conservative campaign than the Fitzpatrick-Foster organization conducted. Its announcement of a renewed campaign, in the face of existing economic conditions, however, came as a decided surprise to those who have been watching the prospects for a renewal of the conflict. It does not seem likely that the campaign will be a belligerent one or that it will speedily eventuate in a new steel strike.

The committee, however, did declare that it would combat any plans on the part of the United States Steel Corporation or any other steel producers, to make radical cuts in payrolls or to reduce the present standards of wages or of mill conditions.

Open Shop Endorsed

The open shop, carrying with it the right of all law-abiding citizens and residents to work when they please, for whom they please and upon any basis that may be mutually agreed upon, was strongly endorsed at a national conference of State manufacturers' associations held in Chicago on Jan. 12. Delegates representing 22 states participated in the deliberations. Resolutions pledging support to the open shop were adopted as follows:

> It is recognized as fundamental in this country that all law-abiding citizens or residents have the right to work when they please, for whom they please, and on whatever terms are mutually agreed upon between employee and employer and without interference or discrimination upon the part of others.
>
> We hereby express our purpose to support these fundamental principles of the American plan of employment by the maintenance of the open shop.
>
> We urge upon our members to secure by discussion and education the active support of workers, merchants, bankers and professional men and all other elements of their respective communities in favor of American ideals and the open shop.

Charles Piez, president Link Belt Co., Chicago, in addressing the meeting, stated that during the war the relationship between performance and compensation was ignored. Wage increases were granted in proportion to increases in the cost of living without reference to the rate of output per man. The only office of national adjustment boards then operating was to ascertain how much living costs had risen and to pay the worker an equivalent increase in wages, whether earned or not. Labor was willing to accept these advances, but with the cost of living declining is it willing to accept decreases to an equal extent? asked Mr. Piez. Some branches of organized labor, he stated, have already announced that they will cling to what they have gained and will resist any cuts in wage rates. It is this attitude, he said, which will defer industrial adjustment until so critical a stage has been reached that labor will be forced to accept the reductions they now oppose. Mr. Piez strongly espoused the adjustment of the wage question in each individual shop without interference by arbitrator or adjustment boards. If the adjustment board plan should become national in scope, it would inevitably lead to outside domination of industry and eventually a labor oligarchy.

Many Men Idle

YOUNGSTOWN, OHIO, Jan. 17.—As a result of the slowing down of the iron and steel industry, unemployment has been substantially increased in the Mahoning Valley. It is estimated 10,000 to 12,000 men are only partially employed, working from one to four days a week.

Leading independents have further extended the eight-hour day. At the plants of the Youngstown Sheet & Tube Co., machinists, bricklayers, repairmen, electricians, carpenters and other like craftsmen, formerly employed on 10-hour shifts, have been put on an eight-hour basis.

The Youngstown district is virtually the only one in the country where wage reductions have not yet been announced by independent iron and steel pro-

ducers, though revisions downward are expected at any time in view of the action of competing interests elsewhere.

Protection for Heads and Eyes

WASHINGTON, Jan. 18.—The latest revision of the "National Safety Code for the Protection of the Heads and Eyes of Industrial Workers" has been prepared by the Bureau of Standards, and will be issued at an early date as "Handbook No. 2" of the bureau. The work has been repeatedly revised and is the result of a set of safety standards prepared by the War and Navy Departments in 1918. These rules have been changed from time to time in co-operation with the advisory committee of these departments.

They represent the result of considerable research into the best methods of giving mechanical and optical protection to the eyes and heads of workers in hazardous industries. For that reason the handbook should be of great interest to various branches of the steel industry in which these hazards are present.

The code makes no attempt to specify a particular style and strength of goggle for a particular operation. Instead it classifies the character of the hazards, leaving it to the employer to assign the particular operation to its proper group.

The bureau invites criticisms of the code as it now stands, especially where such criticism is based upon actual experience in the application of the rules.

A later edition of the code will embody the results of these criticisms.

Failed to Agree

No agreement was reached at the conference between the Iron Molders' Union of North America and officials of the Stove Founders' National Defense Association, which lasted 11 days, according to a statement issued by the national headquarters of the Iron Molders' Union at Cincinnati. An adjournment was taken to April 11, and the 1920 agreement is to remain in force until that time. The union is seeking an advance in wages in certain lines of work, and reductions in certain lines were insisted upon by the association.

Steel Corporation's Welfare Bulletin

Ninety-five pages of pictures and print, chiefly the former, compose Bulletin No. 8 of the Bureau of Safety, Sanitation and Welfare of the United States Steel Corporation for December, 1920. C. L. Close is manager of this bureau.

A page is devoted to a classification of the causes of accidents, illustrated by a chart. A study of the causes of 220,707 accidents in the corporation plants show that but 4.94 per cent were due to machinery causes, excepting those in connection with overhead electric cranes. Hand labor caused 44.42 per cent, the majority of which cannot be controlled by safety devices. It is stated that 90 out of 100 accidents could have been avoided if a little more care had been exercised.

The photographs, which average about six to a page, illustrate what the corporation is doing to promote safety, sanitation and welfare. The following table gives the expenditures of the corporation for the benefit of the employees from Jan. 1, 1912, to Sept. 30, 1920:

Welfare		$14,011,487
Sanitation		14,724,964
Accident prevention		7,538,241
Relief for injured men and the families of men killed		23,662,627
The employees' stock subscription plan		11,246,859
For pension fund payments in excess of income provided by permanent fund		1,978,765
*Total pension payment to employees	$5,408,597	
*Additional benefit payments and administration cost	321,364	
For the creation of a permanent pension fund		8,000,000
Total		$81,162,943

*Not included in total.

Stock for Employees

Stockholders of the Standard Sanitary Mfg. Co., Pittsburgh, at a recent meeting, voted to increase the common stock of the company from $12,000,000 to $20,000,000, and to offer 5000 shares of the common stock and 1000 shares of preferred stock to employees of the company for subscription, at $125 for common stock and $110 for preferred. The plan of selling the stock in general will follow that of the Steel Corporation and provides for a bonus of $5 per share a year for employees buying and holding the common stock for 5 years and one of $2 per share on the preferred stock held for a similar period. Employees of the several plants of the company will be given permission to subscribe, the only restriction being that allotments will be governed by the recommendations of the several managers.

More Optimism in the Coke Regions

UNIONTOWN, PA., Jan. 18.—A slight overproduction resulted in the H. C. Frick Coke Co. operating its coke plants in the Connellsville region only five days last week. The coal plants of the company were operated on a full six-day week basis. No announcement is forthcoming as to whether or not the five-day week in the coke plants is to be continued even this week.

It is stated that, despite the one day layoff, the Frick production for the week will not be materially decreased. The Frick operations have been gradually increasing for several weeks and are now working on a basis of about 90 per cent.

The independent operations in the county continue practically negligible. For the first time in many years the Oliver Snyder Steel Co. plants in the region are closed down. However, there is a distinctly more optimistic spirit in the region than even a week ago.

In the Field of Labor

The Kokomo Steel & Wire Co., Kokomo, Ind., reduced wages from 25 to 40 per cent on Jan. 1. The scale now in effect is that of June, 1918, and is approximately 80 per cent higher than the pre-war scale. A subsequent development was the obtaining of an injunction by the company restraining certain members of the Amalgamated Association of Steel and Wire Workers from interfering with the operation of the plant.

The Locomotive Crane Co. of America has reduced wages 20 per cent at its Urbana, Ill., plant.

The Cushman Auto Tool Co., Urbana, Ill., recently announced a 20 per cent cut in wages.

The Highway Iron Products Co., Ligonier, Ind., has reduced wages 5 per cent and its products 15 to 20 per cent.

The Holt Mfg. Co., Peoria, Ill., has made a 20 per cent reduction in wages. Several hundred workmen refused to return to work when the cut was announced.

The American Steel Products Co., Macomb, Ill., has reduced wages 10 per cent.

Effective Jan. 16, the American Rolling Mill Co., Middletown, Ohio, reduced the wages paid to common labor and the hourly rate on all other jobs to the levels in effect in February, 1920. The new wage for common labor will be 38c. an hour, as compared with the old rate of 47c. Discontinuance of the practice of paying time and a half for overtime is also made, as well as all bonuses paid for non-productive work. The Newport Rolling Mills and Andrews Steel Co., at Newport, Ky., are preparing to reduce the wages paid common labor and day men approximately 20 per cent.

According to a report just issued by the Connecticut bureau of labor statistics there were 280 strikes in that State during the two years ended Nov. 30, last, notwithstanding high wages paid during that period.

In the latter part of this month or early part of February, the General Electric Co. will pay a 5 per

cent supplementary compensation in employees' 7 per cent debenture bonds, as far as possible, the smallest denomination of the bonds being $50. All compensation below that amount will be paid in cash as heretofore. Employees have the right to purchase 7 per cent debenture bonds, paying for same in installments.

Cleaning Castings in a Steel Foundry

Departmental Organization—Routing System with Details of Operation and Payment on Piece Work Basis Discussed

IN the majority of steel foundries it costs as much or more to clean the castings and prepare them for the shipping platform as it does for the molding and coremaking, according to A. W. Gregg, Whiting Foundry Equipment Co., Harvey, Ill., in a paper, "Cleaning Castings in a Steel Foundry," presented at the recent annual meeting of the American Foundrymen's Association at Columbus, Ohio. "The finishing department," he holds, "is usually a source of continual worry to the foundry superintendent and is the place where delays are most apt to occur. It is easier to get a casting molded and poured than it is to get it through the finishing department, but in many shops there is a tendency to feel that the job is out as soon as the molds are poured, in spite of the fact that an uncleaned casting is of no more use to the machine shop or customer than the mold in which it was cast." The paper largely in full follows:

Probably the greatest problem which the finishing department is called upon to solve lies in securing labor. The work is hard and disagreeable under the very best of conditions, and the class of labor which can stand the wear and tear of a steel foundry finishing department is always scarce, especially so with the present restricted immigration. The remedy obviously lies in making the surroundings as pleasant as the nature of the work will permit and in using all the labor-saving machinery which the market affords.

Kind of Floor Important Factor

The kind of floor and the method of transportation castings in the finishing department require careful study. Where the work is light enough to be handled by hand, creosoted wood block makes the best floor. With a good floor it is possible to use the lifting truck for transportation and this is the neatest and cheapest method for handling small steel castings. Where heavy castings are produced they must be handled with a crane and the floor in this case is not of such great importance.

In a steel foundry of any size proper organization demands that departmental lines be strictly drawn. Following the natural classification of the work, the operating departments are: Metal department, molding and coremaking departments, and finishing department.

Each of these departments has numerous subdivisions. The metal department's responsibility ends with the delivery of sufficient molten metal of proper composition and temperature to the molding department. The molding department is held responsible for setting up the molds, pouring into them the molten metal, shaking out the castings and delivering them to a definite location in the finishing department. It is very essential that each department be held to strict accountability for definite and well defined operations.

The system of subdividing the work should be followed in each department, and a great deal of confusion and waste of labor is avoided if a very definite plan of operations be adopted. Especially is this true of the finishing department. One steel foundry with which the author is familiar adheres so rigidly to a definite plan of operation that all castings are put through the sand-blast whether necessary or not; the claim being made that it is less expensive to sand blast than to sort out and short-cut the occasional castings which peel out sufficiently clean to make the sand blast operation unnecessary.

Routing of Work Important

It is impossible to lay out a system of routing which will be best for all conditions, but the following probably will satisfactorily meet the conditions found in most steel foundries. We will assume that the molding department is held responsible to shake out the castings, knock off the loose sand, and deliver them to a definite location in the finishing department.

First operation, flogging. Gates and light risers are broken off with a sledge, first being nicked with a chipping hammer. Large cores are knocked out or loosened up on the flogging floor preferably with a heavy pneumatic chipping hammer used with a long chisel. If the castings are light enough to be handled by hand a power sprue cutter is a great labor saver. The gates and scrap which accumulate from the flogging operation and the sprue cutter should not be thrown upon the floor, but collected in boxes. If a charging machine is used at the furnace, the charging boxes should be used, if not, dump buckets which can be handled by the crane and readily transferred to the stock yard or charging platform. This saves one handling of scrap material and prevents a mussy accumulation which is a waste of floor space.

Second operation, sand-blasting. The sand-blast equipment should be carefully selected to conform to the class of work. Great improvements have been made in sand-blasting machinery in the last few years and the foundry now has a selection of several different types adapted for light or heavy work. All modern sand-blast rooms have an exhaust system which changes the air four to five times per minute. The sand falls through the grating in the floor, is automatically elevated, screened and returned to the pressure tank. It is important to secure the proper quality of sand, and attention should be given to the use of the proper sized nozzle. Compressed air is expensive and its consumption should be carefully watched.

Cutting Risers with Torch

Third operation, flame cutting risers. After sand-blasting, the risers are removed with the flame cutter. The oxy-acetylene torch is used almost universally for cutting risers and heavy gates from steel castings. This can become a very expensive operation if the consumption of oxygen and acetylene is not given careful attention. The natural tendency of the operator is to use a larger tip and a higher pressure on the gas than is necessary, for this makes the cutting easier and more rapid. A small bonus to the operator based on economy in the consumption of gas is usually very beneficial. Some foundries prefer to cut the risers from castings before sand-blasting to economize room on the sand-blast car or table. When this is done a chipper must remove sand where the cutting is to be done, as the operation of the torch is interfered with by the sand adhering to the risers.

Fourth operation, welding. If welding is necessary it should be done at this point. The electric arc welder and the oxy-acetylene welding outfit are to be found in most steel foundries, although not given especial prominence when visitors are taken through the shop. The electric weld is made more rapidly and at considerbly less cost than the gas weld, although the gas weld when carefully made is considered somewhat more reliable. No welding should be allowed except by instructions from the inspection department and should always be followed by annealing to remove internal strains caused by the high local heat of welding.

Fifth operation, annealing. The castings are now ready for the annealing furnace. Practically all foundries are now using oil-fired annealing furnaces of the car type, although coal and gas-fired furnaces are in

use in many foundries and powdered coal and producer gas are used to some extent. All steel castings without exception should be annealed, and the proper temperature, length of time and manner of cooling should be adapted to the composition of the steel under the supervision of a competent metallurgist. A reliable pyrometer installation is essential. The use of cast iron or steel grids increases the capacity of the annealing furnace by allowing the castings to be unloaded while still too hot to be handled in any other way, and the next charge being ready on another set of grids allows the furnace to be recharged at once, thereby saving considerable fuel. Careful attention to the type of oil burner and economy in the use of oil is very essential in these days of high priced fuel. The annealing furnace should be so designed that the flame does not impinge directly on the castings and so that it is possible to heat uniformly all parts of the annealing furnace. An oxidizing flame should be avoided as it causes excessive scaling.

Sixth operation, sawing risers. This operation has been eliminated by the flame cutter in the majority of foundries but where heavy castings with large risers are produced saws are used for their removal. When this is the case the risers are sawed off after annealing. This is especially necessary where high carbon or alloy steel castings are manufactured. When the flame cutter is used the risers are removed before annealing to economize room and oil in the annealing operation.

Seventh operation, chipping. The castings are next delivered to the chippers who remove fins and lumps with pneumatic chipping hammers. Small castings are chipped on benches equipped with vises to hold the work in place. Larger castings are chipped on the floor or on horses.

Eighth operation, grinding. The lumps usually left where the risers have been burned or sawed off, and where the gates have been broken, are removed on the grinders. Swing grinders are essential for large castings and stand grinders are used for the lighter work. In order to economize in the use of grinding wheels it is well to have two or three different rates of speed for the grinders, the new wheels being used with the slowest speed and moved to the grinders with higher speeds as the wheels wear down. This also promotes grinding efficiency by maintaining a relatively uniform peripheral speed as the diameter of the wheel is reduced in grinding.

Ninth operation, tumbling. The final operation in the finishing department should be to tumble all castings whose size permits them to go into the tumbling barrel. This removes annealing scale and produces a bright clean surface on the castings. Castings too large for the tumbler should be sand-blasted. The tumbler, however, furnishes a much more presentable casting and tumbling is a far cheaper operation than sand-blasting. In some foundries where the nature of the work permits, the tumbler can replace sand-blasting.

Inspecting the Castings

The castings are now ready for final inspection, sorting and weighing. Inspection at every operation is a very important part of finishing department work. First inspection should be made on the flogging floor and castings which are obviously defective rejected at this point. Some defects do not show up until after sand-blasting, so an inspection is necessary after the castings leave the sand blast. At this point also the castings on which welding is necessary and allowable are marked by the inspector.

The foundry foreman should be constantly in touch with the inspection department and the foreman of the finishing department, not only for information concerning defective castings, but also to study the possibilities of decreasing labor in the finishing department by changes in gating, elimination of unnecessary fins, and to observe how the facing is peeling from the castings. Here an ounce of prevention is worth many pounds of cure. It is often cheaper to scrap a casting than to clean it up.

Piece Work or Bonus System

Without doubt the finishing department is the most difficult part of the foundry in which to introduce a piece work or bonus system of payment. The amount of work to be done on castings from the same pattern varies from day to day with the condition of the molding and core sands, and the care taken by the molders. Especially in the foundry which produces a wide range of castings is the task of setting rates extremely difficult. The writer has tried day work, premium system, piece work, and various bonus systems. Some conditions demand a combination of all of them. There is no department in the foundry where a system of bonus payment or piece work is so necessary, for the output of a man working day work is invariably doubled when he is given a rate. In the writer's experience, piece work based upon the tonnage of castings handled produces the best results. A liberal rate is better than one which is too close and some flexibility in the rates must be allowed to provide for faulty conditions of facing sand and molding practice which cause extra work in cleaning the castings.

Piece rate systems of payment in the finishing department have a very salutary effect on the molding and coremaking departments, for the chipping room boss will certainly make a first-class pest of himself when castings come to him with an unusual amount of fins, scabs or lumps or when the cores are too hard. When the chippers have difficulty to make their day's pay the rest of the shop is sure to hear all about it. When the piece rate system is introduced it is necessary to tighten up on inspection at once, and the inspector should be called upon to O. K. the piece workers' earnings.

A finishing department of any size should have its own tool and store room. Grinding wheels, hose, sand-blast nozzles, saw teeth, waste and lubricants should be stored here. Very few chippers are capable of properly grinding their own chisels and a supply of ground chisels ready for use should be kept on hand. All pneumatic chipping hammers should be returned to the tool room every night and given a kerosene bath. The cutting torches, regulators and hose should also be in the tool room when not in use.

Railroads Store Cars

In marked contrast to the car shortage which existed last winter, if the action of the principal carriers in storing cars, which are going on sidings, on back tracks of yards and on spurs which have been retired from other business.

The contrast is especially marked in large steel producing centers, such as Pittsburgh and Youngstown. The Erie, Baltimore & Ohio, Pennsylvania and New York Central announce that they are storing cars in large numbers. All these roads have cut their yard forces approximately 10 per cent.

The steel special operated by the Erie from the Valleys to New Jersey is being liberally used by district manufacturing interests. The train is now frequently run in two sections to take care of the business.

The Erie operates another train west from Youngstown known as the tin plate special. This train was started during the war, the carrier utilizing returning refrigerator cars largely for the traffic. The train is now regarded as a permanent feature.

Thursday, Dec. 29, the Todd Dry Dock & Construction Corporation launched from its docks at Tacoma, Wash., a 6000-ton steel motorship Kennecott for the Alaska Steamship Co. of Seattle. She was built in exactly 45 working days from the time the keel was laid, and is said to have cost $1,200,000, and is the first steel motorship to be built in the Northwest.

The American Steel & Wire Co., Waukegan, Ill., is replacing 16 250-hp. boilers with five 800-hp. boilers. The work will be done without any interruption in operations.

SAFETY PRIZE STATUETTE

To Be Awarded to the Plant of the Carnegie Steel Co. Making the Best Record in 1921

As a stimulus to the safety movement in its plants the Carnegie Steel Co. has placed the safety work on a competitive or sporting basis, its 13 units being the competitors for a trophy that has been offered by the company. The trophy is a bronze statuette symbolizing safety. It is 26 in. high and is 10 in. in diameter through the base. It is the composition of Moretti of Pittsburgh, and is the first attempt to symbolize safety. The trophy was put in competition the first of the year and is to be awarded monthly to the plant making the best record for safety, and making the best percentage in a ranking report, based on the least number of accidents that cost loss of time in proportion to the men employed. As each plant wins the trophy, it will be held by that plant for the succeeding month; the name of the plant is to be inscribed on the base, with the name of the month for which it was awarded and at the end of the year the plant winning the trophy the greatest number of months becomes the perpetual holder.

The idea of competition in the safety work assumed form a year ago and the trophy idea was placed in Mr. Moretti's hands. It was impossible, however, to work out the idea in time for competition during 1920, because of the difficulty in deciding upon a symbol, no precedents existing to aid the sculptor. The plants and the safety men, however, went forward on the competitive basis with the result that 1920 proved to be one of the greatest years of progress in safety in the Carnegie Steel Co. plants.

The statuette is a most artistic production portraying grace, strength and power, and the sculptor's story of the composition is:

"The greatest power in the world to-day is production. Production must be brought about through labor. In the progressive age in which we live machinery has been brought to such perfection as to largely eliminate the necessity of physical strength; but machinery uncontrolled is destructive both of human life and production. This thought is given expression in the figure of a young, vigorous, perfect man, indicating well-balanced control. He emerges from and above machinery. It is through his mental-physical control that he governs machinery for the safety and production of the world; therefore predominating over his machine he holds the world in his hand."

Around the base of the piece are the words, "We Conquer by the Mind," a loose translation from the Greek.

The plants that are in competition for the trophy are the Edgar Thomson Steel Works, Braddock, Pa.; Duquesne Steel Works, Duquesne, Pa.; Homestead Steel Works, Munhall, Pa.; Clairton Steel Works and By-Product Coke Plant, Clairton, Pa.; "Ye Olde Mille" or city mills, those of the company located within the city lines of Pittsburgh; the city furnaces, those blast furnaces also within city lines; the works at Farrell and Sharon, Pa., the mills of the Youngstown district, the Columbus, Ohio, plant, the Mingo Junction, Ohio, plant, and Bellaire, Ohio, plant, the Newcastle, Pa., plant, and the Union Railroad.

Steel Production in Mahoning Valley

Figures compiled by iron and steel companies in the Mahoning Valley show that Youngstown produces one-sixth of the pig iron and one-eighth of all steel made in the United States. Estimates place the consumption of iron ore in 1920 by Valley plants at 11,197,859 tons, limestone 3,228,559 tons and cinder 655,548 tons. Production of pig iron last year is estimated at 6,250,611 tons; steel ingots and castings—2,843,455 tons of Bessemer and 4,462,061 tons of open hearth. Total production of rolled products is placed at 3,765,998 tons, including 1,133,712 tons of sheets and plates; 225,306 tons of wire rods; 791,691 tons of merchant bars, including concrete bars; 701,376 tons of skelp and 913,913 tons of other rolled products.

The iron and steel products manufactured by Valley plants include rails, pipe, sheets, plates, bars, rods, wire and wire products, tinplate, conduit, electrical cable. Subsidiary to the steel industry are many manufactories which use steel or its by-products.

Probably 60 per cent of the labor employed in the steel mills is of foreign birth, one large company having on its payrolls men of 34 nationalities.

An idea of the tonnage to and from the Valley is apparent by collated figures, indicating an average of 600,000 cars per year, which means that Youngstown's inbound traffic was substantially 28,500,000 tons at its heaviest. The annual inbound traffic of the roads serving Youngstown is estimated as follows—coal 11,000,000 tons; ore, 8,500,000 tons; flux stone for furnaces, 2,000,000 tons; coke, other than by-product manufactured at the steel plants, 2,000,000 tons; scrap iron and steel, 1,500,000 tons; miscellaneous traffic to industries and other consignees, 3,500,000 tons.

Since 1887 capital invested, most of it in iron and steel plants or works of a subsidiary nature, has increased from $600,000 to about $400,000,000.

Increased Output of Magnesite in 1920

The domestic magnesite industry as a whole enjoyed a good year in 1920. The quantity mined exceeded that mined in any previous year except 1917. Notwithstanding the contention made by the domestic producers in 1919 that without a tariff the market in the eastern part of the United States would be supplied with European magnesite and that companies which had made large investments in magnesite deposits and plants in California and Washington would be forced out of business, no tariff legislation was enacted, and the industry seemingly has not suffered disaster.

Preliminary figures reported by the U. S. Geological Survey indicate that the production of crude magnesite in Washington was about 235,000 net tons, as compared with 106,200 tons in 1919. Practically all this was dead-burned and was sold as refractory material to steel companies and manufacturers of refractory products east of Chicago. The figures for California are not yet available, but the output of crude magnesite in the State was about 60,000 tons. California and Washington are the only producing States, and the total output for the United States was therefore probably between 275,000 and 300,000 tons.

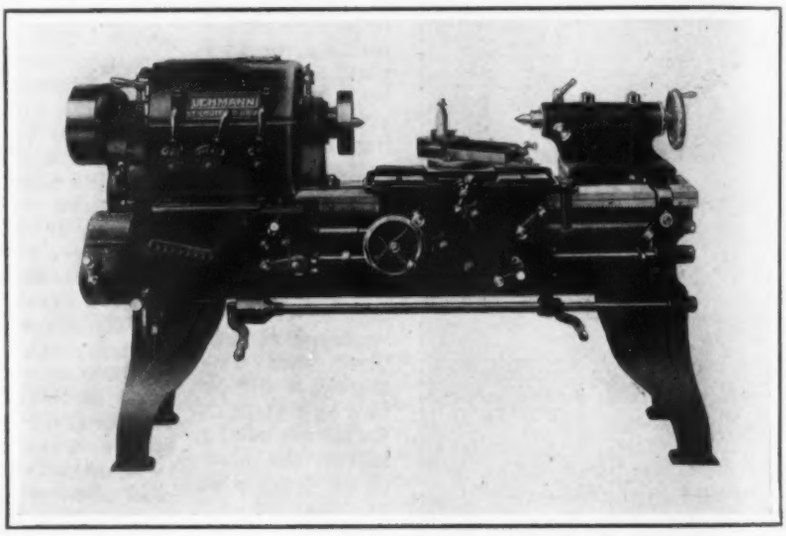
The Worcester Tram Rail Co., Boston, overhead tracks, switches, scales, etc., has begun business at 1 Washington street. Daniel Worcester, who for 17 years was associated with J. Duncan Co., Everett, Mass., overhead tracks, is proprietor.

The Babcock Printing Press Mfg. Co., New London, Conn., distributed cash bonuses totaling about $4,360 to its 282 employees at Christmas. The distribution was based on the rate of increased production at the plant from June 1 to Dec. 1.

Geared Head Engine Lathe

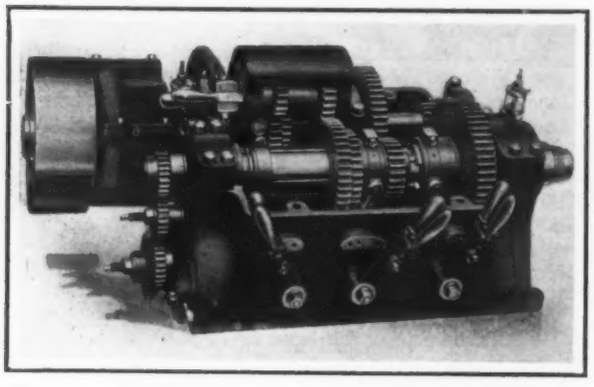
Sixteen spindle speeds with but 10 gears in the headstock and a high gear ratio are features of the new geared head lathe manufactured by the Lehmann Machine Co., St. Louis. The spindle speeds range from 10.5 to 422 r.p.m. on the 16-in. lathe and from 8.5 to 330 r.p.m on the 22-in. lathe. These speeds are in almost exact geometrical progression and all are obtained without the use of a countershaft. No safety or interlocking device is required to avoid engagement of different gear ratios at the same time, it is explained, as the design is such as to make it impossible for this to occur. The tooth travel of the gears is moderate at all spindle speeds which is emphasized as giving a quiet running machine at all times.

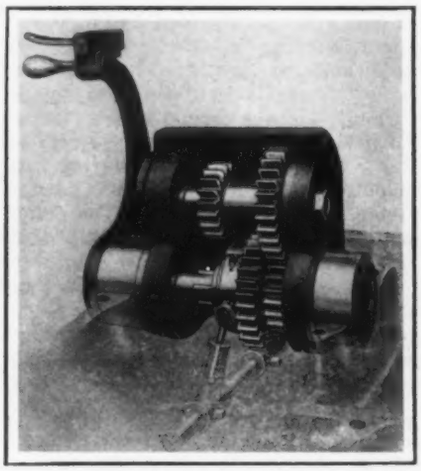
The gear ratio on the 16-in. lathe is 57.1 to 1 and on the 22-in. lathe 70.6 to 1, with other sizes in proportion. This permits the use of a high speed driving shaft and its position allows a large diameter of driving pulley. This provides a desirable speed of belt travel thus reducing strain on the belt and bearings. The head forms an oil tight case inclosing all running parts and lubricates all the mechanism. All shafts are high carbon steel and run on ball bearings. Shafts having sliding members are made with four keys milled integral with the shaft. All shifting members are operated by a ring which runs in and completley encircles a groove. The compensating mechanism connecting these rings with the operating shafts is emphasized as of substantial construction.



Sixteen Spindle Speeds Are Provided in New Lehmann Geared Head Lathe, with But Ten Gears in the Headstock

The lower right hand illustration shows the construction of the rocker and the method for its operation without having openings in the headstock for the controlling handle





The spindle is alloy steel and has hardened and ground bearings and runs in bronze boxes. Where the back gear clutch slides on the spindle, there are four keys milled integral with the spindle. There are two diameters on the spindle nose both giving bearing for face plates or chuck plates, one bearing being in front and one bearing behind the threads on the spindle nose. This, it is explained, gives a rigid connection of chuck plates on the spindle and facilitates the putting on and removal of the plates.

Friction clutches have forward and reverse or brake operated by a handle on the apron and a similar handle at the headstock end of the bed. This mechanism is operated through helical spur gears which run in oil and are mounted on shafts having ball bearings. The cover on the clutch housing forms an oil tight case and the clutches run in oil at all times. The male cone is hardened steel and female cone cast iron thus to insure long life.

The usual arrangement for direct drive is to mount the motor on the headstock with the drive through a short belt and idler, which runs on ball bearings. The direct drive can also be furnished with motor mounted on a base hinged to a leg of the lathe. With the latter arrangement no idler is required. A suitable guard for the belt and pulley is provided.

Domestic Production of Copper in 1920

The smelter production of copper from domestic ores during 1920 is estimated by H. A. C. Jensen, of the U. S. Geological Survey, to be about 1,235,000,000 lb., compared with 1,286,000,000 lb. for 1919. The production of refined copper from foreign and domestic ores for the year was about 1,573,000,000 lb., which is approximately 195,000,000 lb. less than for the year 1919. The apparent domestic consumption was about 910,000,000 lb.; in 1919 it was 877,000,000 lb. The stocks of raw and refined copper at the end of 1920 were about 874,000,000 lb., which represents a decrease of 30,000,000 lb. from those held at the end of 1919. The total imports of raw and refined copper for the 10 months ended Oct. 30, 1920, according to the Bureau of Foreign and Domestic Commerce, were 407,437,515 lb. Exports of copper for the same period were 543,695,851 lb., compared with 516,627,775 lb. for the entire year 1919.

The continued decreased production, the large stocks, and the low domestic consumption were due entirely to the generally depressed conditions of industry throughout the world, which did not permit the absorption of as great quantities of copper as had been hoped for.

Low exchange and the great stocks of scrap and secondary copper available both in the United States and abroad also decreased the demand for new copper.

The Atlanta district office of the Wellman-Seaver-Morgan Co., Cleveland, has been transferred to Birmingham, Ala., Room 302, American Trust Building. Quin W. Stuart continues as district manager.

MORE IDLE STACKS

Reduced Capacity in Operation in the Mahoning Valley—Tube Plants Busy

YOUNGSTOWN, OHIO, Jan. 18.—Increasing blast furnace suspensions in the Mahoning Valley reflect the inactivity in the iron and steel market. Two additional stacks have been suspended by leading interests, while a third has been ordered out of blast. Steel production of the Valley is at the rate of 45 per cent this week, though the average with the independents is but 33 per cent. For the first time in many months, the Republic Iron & Steel Co.'s open hearth furnaces are not in operation this week. Sheet mill capacity is being operated to the extent of about 20 per cent. Carnegie Steel Co. continues to operate close to normal. Some improvement in business is reported by fabricating interests, which have received small orders.

When the suspensions become effective, but 14 of the 25 stacks in the Mahoning Valley will be in blast.

Sheet mills are being operated at a greatly reduced rate by the Sheet & Tube Co., Trumbull Steel Co., Brier Hill Steel Co. and Sharon Steel Hoop Co. Only six of the 28 sheet mills of the Brier Hill Steel Co. are in commission.

As usual tube mill departments register the best operating schedules among the independents. The Republic company is operating all of its tube mills, while the Sheet & Tube company has 10 of 11 active. These units are engaged turning out unfilled tonnage, as new business has been reduced to a negligible volume.

The most optimistic reports emanate from fabricating and pressed metal manufacturers, who state that small orders now being placed preface a more general buying movement. A company which manufactures boilers and tank equipment shipped a large tonnage during the week to Mexico.

Some interests profess to see a period of inactivity in steel buying to extend beyond the first half.

Leading producers are booking very little new business, buying being confined largely to sheets, tin plate and strip steel. "We are picking up a few carloads of business now and then," states an executive, "but we would almost rather not have them. Production under 50 per cent often loses more than complete suspension."

Current tin plate orders are being booked in small volume at $7 per base box. Usual volume of demand from the canneries in the salmon packing regions of the Northwest is lacking owing to the poor salmon pack. The situation has produced an easing up in the demand from that quarter.

Sheet buying is light and for small tonnages, the galvanized trade being somewhat larger in volume, owing to demand from makers of roofing products.

Though semifinished buying is virtually at a standstill, makers show no inclination to go lower than $47 for sheet bars. Business in scrap materials is stagnant. Coal is available at new low prices, the best three-quarter screen gas coal being obtainable at from $3 to $3.75, f.o.b. mine.

Abrasion and the Hardness of Steels

WASHINGTON, Jan. 18.—The Bureau of Standards has made an interesting investigation on the influence of abrasion on the hardness of the various types of steels. "In all cases except the high-carbon austenitic steel," says the report, "no pronounced effect of abrasion upon the steels used in these experiments was observed. In all cases the hardness of plain carbon steel containing 0.85 per cent shows the greatest increase in hardness. The alloy steels generally show a smaller increase in hardness of abraded surface than plain carbon steels, and in some cases they show a decrease of surface hardness. The alloy steels generally show a smaller increase in hardness of abraded surface than plain carbon steels, and in some cases they show a decrease of surface hardness. High-carbon austenitic steel shows a marked decrease of Brinell and scleroscopic hardness. This process of abrasion viewed in the light of Beilby's theory may be considered as resulting in the production of amorphous matter at the expense of crystalline matter which affects the hardness of the abraded surface of the metal, but probably not the general character of its structure. As to the increase of Brinell and scleroscopic hardness of high-carbon austenitic steel, the following explanation may be suggested: According to Benedick's pressure theory, the martensite should be present in a greater amount on the lower layer of the examined specimen than in the inner portion, and it seems possible that if the surface layer is ground away the next or more austenitic layer should be found to be somewhat softer."

Heat Treatment of Carbon Steel

A statement has been made of the work of the committee on the heat treatment of carbon steel of the engineering division of the National Research Council. Steel specimens for these investigations are provided by the John A. Roebling's Sons Co., and rolled into round bars by the Carpenter Steel Co. The heat treatments and some microscopic examinations are being conducted in the private laboratory of Dr. Henry M. Howe, chairman of the committee, "who has devoted nearly all of his time during the past fifteen months, without pay." Microscopic examinations are also made at the University of Minnesota. Magnetic tests are made at the Bureau of Standards. During the year ended June 30, 1920, $10,000 was provided by the Bureau of Standards and the Bureau of Mines, but owing to curtailment of Congressional appropriations their contribution for the current year has been reduced to $3,500. The test pieces are being machined by the Bureau of Mines at Pittsburgh, the Bethlehem Steel Co., the Neverslip Co., the General Motors Corporation, and the American Tool & Machine Co., without charge. The mechanical tests are being made at the Bureau of Standards and the Watertown Arsenal.

British Iron and Steel Output in December and 1920

LONDON, ENGLAND, Jan. 14 (*By Cable*).

Production of pig iron in Great Britain in December amounted to 675,300 gross tons and that of steel ingots and castings was 746,600 tons, compared with 403,800 tons of pig iron and 503,900 tons of steel in November. The December figures reveal a return to nearly normal output, severely reduced in October and November by the coal strike.

The total production of pig iron in 1920 was 8,001,300 tons and of steel ingots and castings 9,155,600 tons. The 1920 pig iron output compares with the record output of 10,260,000 tons in 1913 and 9,420,000 tons in 1917. The steel production last year was not far from the record output of 9,804,079 tons in 1917 and compares with 7,663,876 tons in 1913.

Electrical Engineers' Meeting

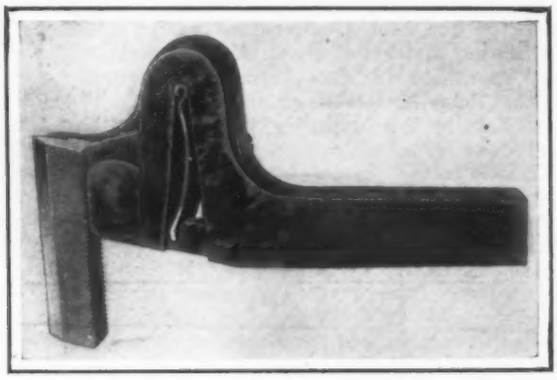
"Relative Depreciation of Machinery" is the subject of a paper to be read at the monthly meeting of the Association of Iron and Steel Electrical Engineers at Hotel Chatham, Pittsburgh, Saturday evening, Jan. 22, by L. F. Galbreath, electrical superintendent, West Penn Steel Co., Brackenridge, Pa. This paper will discuss the relative depreciation of machinery. No attempt will be made to set a definite value, as this value depends entirely on the method of installation, the construction of the machinery and the care which it receives. The change of molecular structure is due to fatigue of materials and temperatures and shows the critical point at which a high rate of depreciation takes place and also the conditions necessary for a minimum depreciation and maximum production.

On motion of the prosecuting attorney, J. A. Haines, former secretary of Queen City Lodge, Cincinnati, of the International Association of Machinists, was dismissed on the charge of embezzling over $12,000 of the funds of the local. An audit of the books of the union freed Haines of any suspicion of diversion of funds which passed through his hands. During the hearing it was brought out that the Cincinnati lodge of machinists had a strike fund last year of $174,000.

Spring Tool for Cutting Threads

A new tool which utilizes the goose neck principle to eliminate chatter and permit the cutting of smooth threads on lathe work has been developed by the Ready Tool Co., Bridgeport, Conn. The cutter is held at an angle of 15 deg. and side angles are ground to cut 60 deg. threads. The cutter, being held on the left side of the holder, enables the operator to work close up to a shoulder. The spring, it is explained, permits the use of high-speed cutters and at the same time produces smooth work.

Notched teeth are cut in the back of the cutter and in the front of the dog, the two being clamped together.



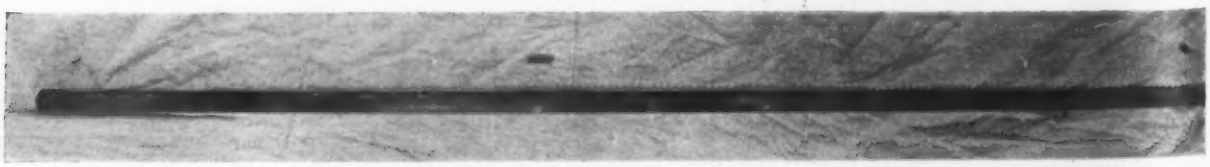
The Goose Neck, Together with an Auxiliary Spring, Provide for the Cutting of Smooth Threads on Lathe Work Without Chatter

A bolt holds the dog to the tool holder, thus to prevent the cutter slipping. An auxiliary spring with set screw is incorporated in the holder, and by increasing its pressure heavy pitches such as four, six and eight can be cut, it is explained, as smoothly as the finer ones; in the latter case, the auxiliary spring is released.

It is pointed out that since the top surface of the cutter, only, is required to be ground, the tool can be used by inexperienced mechanics, and still get a perfect thread. A Woodruff key is provided in the bottom to overcome side thrust. V cutters as well as U. S. standard pitches and chasers can be supplied. The tool is made in right-hand offsets, size ½ x 1 x 7 in.

Broaches of Unusual Length Hardened and Straightened

The accompanying illustration shows two extremes in broaching which offered very different problems in the matter of hardening and straightening. The short broach is an insertable broach used in cutting oil grooves in babbit parts and is 1¾ in. long. The long broach is 96 in. long. These tools had to be hardened and straightened so that they would clean out in grinding; 0.008 in. was allowed for grinding so that the long broach had to be straightened within close limits. The broaches were made of 1.10 carbon tool steel and were produced by the American Broach & Machine Co., Ann Arbor, Mich.



Two Extremes in Broaching Presented Different Problems in Hardening and Straightening. The long broach has a length of 96 in.; the short broach, at the center and slightly above the long one, is 1¾ in. long.

The New Era Spring & Specialty Co., Grand Rapids, Mich., has distributed the customary annual bonus of $100 to employees who served one year or more and $50 to those who served from six months to a year.

Effective Jan. 29, there will be a reduction of 10 per cent in the pay of all salaried officials and salaried employees of the Norton Co., Worcester, Mass.

Safety First in a British Plant

The progress in the safety first campaign of the steel plant of Thomas Firth & Sons, Ltd., in Great Britain is outlined in the official report of the proceedings of the Industrial Safety Conference, organized by the Home Office and the British Industrial Safety First Association, held at Olympia, London, last fall. This report is summarized in the *Iron & Coal Trades Review*.

The committee to promote safety first is chosen from the workmen from the steel making departments, rolling mills, forge shops, foundries and machine shops. Eight men form the committee and no foreman is admitted. One member retires each month, another taking his place, thus allowing a maximum number to become intimate with the work. A box has been placed in a convenient location, into which any workman may drop a suggestion for improving the safety element. The committee considers each suggestion.

At the time of this report there had been 38 committee meetings, with a total of 176 suggestions, giving an average of four or five at a meeting. Not more than half a dozen suggestions have been found impracticable. The following are typical flaws pointed out: Guards on belts or machines missing or broken, broken floor plates, lack of illumination, roof glass broken and in danger of falling and danger from electric wires. Out of 482 accident cases reported in May of last year not one was due to the absence of a safety device, but rather was due to its being in need of repair or to faulty movements of the workman.

"The majority of firms will not find it necessary to appoint a special safety engineer," continues the report, "and the duties of the secretary to the committees can well be combined with any other work, the chief consideration being to provide a suitable man." Special stress is laid on the importance of the heads of firms taking interest in the efforts towards safety first. "Failure is likely to await the campaign if the interest taken in it is left to those in more or less subordinate positions."

"It is beginning to be felt, that, in order to maintain the interest in the safety first campaign and to reduce still further the number of accidents, further efforts still are required and it should be possible to devise some competition which will appeal to the various departments in a large works on the lines of the "Dodge" system in America. The only possible disadvantage that suggests itself is that this may tend to reduce the number of cases reported to the ambulance rooms in order to attain a higher place in the competition, and thus defeat its own object; but it is very questionable whether in practice this difficulty would attain any great importance.

"It has been found that with the inception of the safety first campaign the number of minor injuries attended at the ambulance rooms immediately increased, this being due to the stress laid on the importance of attending to all scratches. At the same time, however, the number of more serious cases showed a diminution."

Initial shipment of cement from the new plant at Bessemer, Pa., of the Bessemer Limestone & Cement Co., Youngstown, Ohio, went forward last week. Two of the company's three kilns are in operation.

The Allis-Chalmers Mfg. Co., Milwaukee, Wis., has received an order from the Illinois Steel Co. for $1,000,000 worth of gas engines to be installed at the South Chicago plant.

Bulletin Board Education in Forge Shop

A Practical Superintendent's Ideas on Increasing Efficiency and Production—Simple Posted Messages

BY JOHN H. LLOYD*

THE use of a bulletin board as an educational feature is a valuable asset to forging concerns either in the forge shop or office when utilized in a common sense way and without fear or favor. From it can be gleaned enlightenment and instruction that in my mind is very vital and far reaching in results. Shop hands can be taught to realize their sense of duty; objects and purposes can be attained, in fact everybody concerned becomes more thoroughly interested in his business and the primary object of the contents of a bulletin board can be attained even better than by heart to heart talks. While I am a great advocate of both mediums for putting across a message, through experience I find the difference between the two is, that heart to heart talks only affect men's emotion for a short time, ofttimes they only go in one ear and out the other and that ends it, while a talk from the bulletin board takes root in a man's mind to stay, simply because he sees it every time he passes up and down the shop or office. Thus he becomes aroused as never before, and concludes good naturedly that the information thereon is meant to help him to do his thinking and scheming and eventually, therefore, he decides to be guided accordingly.

My first experience with a bulletin board began eight years ago, while general foreman of the forging department of one of the largest wagon manufacturers in the West. I shall never forget my initial introductory advice thereon, how it was criticized and made fun of, but that did not deter my belief that some day it would serve its purpose and that many would come to appreciate my efforts in their behalf. Finally I did have the pleasure of seeing my aims and purposes come true. Within six months' time, in fact, I had converted every one of the 155 men under me to the bulletin board principles. It was really astonishing to see how at the beginning of each week when something new was placed upon the board hundreds of men and even officials from other departments of the large plant, which, by the way, covers 101 acres, used to visit my department just to read and study contents of the board.

The outcome of it all, of course, was increased production (of 100 per cent at least, I should say) and a bunch of loyal satisfied pieceworkers, because the increased production had brought them increased wages. Incidentally, also, there was a very material decrease in the consumption of fuel oil, fire brick, light, etc. At the end of every month I had the pleasure and satisfaction of receiving commendable letters together with detailed reports from the assistant manager, showing what I had accomplished in an economic way and it was at his suggestion that I put the reports on the bulletin board, so that all the men could see and read them. The product of this department was

A Few Don'ts in the Interest of Safety First

Don't throw stones or waste at each other, even in fun, it sometimes ends up in a fight.

Don't climb up on the roof, unless ordered. You not only damage it, but you may descend therefrom with a broken limb.

Don't gossip in the shop. You may hear something about yourself that will hurt your feelings and that is not the worst of it, you are doing it on the company's time.

Don't attempt to grind anything without putting on goggles; to ignore them may mean the loss of an eye.

Don't knock but boost your employer, wish him an abundance of success, for his success means the search light of prosperity for you.

Starting in leaflet No. 2, I shall from time to time give you a few hints on problems pertaining to waste, etc., as I see it in our works to-day. I shall suggest and explain how a little economic forethought on the part of everybody concerned will help to bring us more orders, etc.

Yours truly,
JOHN H. LLOYD, *Superintendent.*

No. 1.

A Few Economy Tips

I want to suggest to my forgemen that you be governed in the shop along economic lines, with just as much consideration as you would be governed in your own home. For instance, when the heater at home has made the living rooms comfortably warm, you lose no time in hurrying to shut off the draft, and the reason is quite obvious. Why? To save the fuel bill, of course. Then tell me why the same kind of economy cannot be practised in the shop. Kindly remember that your employer must pay for all the coal that you may cause to be unnecessarily consumed, by allowing the hammers to oscillate up and down between heats and other times, when no forging is being done, and he also must pay for the numerous gallons of oil that unnecessarily goes up in smoke every month, caused by the laxity of both operator and helper to reduce the oil pressure when such opportunity presents itself.

Men, in playing any game, it pays to play honestly and fair. So play fair with the source of yours and your family's bread and butter. All put your shoulder to the wheel of economy and save the trouble of having to pay unnecessary bills. It will not only mean a closer relationship between employer and employees, but an abundance of good orders will be the result.

If our competitor economizes and we don't, it means that he will get the orders and we won't. His men will work steady and we must loaf. Let's beat him to it, economize whenever we can, and if there is anything I can do to help along the cause, don't be afraid to tell me. Let us start at once without any more delay, for a stitch in time saves nine. Procrastination is the thief of time.

Yours truly,
JOHN H. LLOYD, *Superintendent.*

No. 2.

*Superintendent Rivetless Chain & Engineering Co., Avon, Pa.

forged wagon iron and steel parts of every description, including singletree and doubletree hooks, clips and rings. The equipment consisted of steam and board drop hammers, bradley trip and belt hammers, bulldozers, upset and bending machines, with oil as fuel.

Since then I have tried the scheme in other concerns with equal success and I want to suggest to forging manufacturers in particular, that they install bulletin boards in their forge shops, and at least place thereon, if nothing else is available, leaflets about the size of a letter head with typewritten suggestions, kinks, ideas, tips or a short, spicy article intertwined with a witty or humorous jingle, that always pertain to the men, their jobs, hammers, trimming presses, etc.

Pages and pages, chapters upon chapters, on production, waste and economy, can be intelligently written and brought to the shop men's attention by way of the bulletin board. Just think for a minute how extensively the most prominent newspaper publishers in all the large cities are using bulletin boards outside their offices to give the citizens the latest tips or baseball news, with the crowds of humanity standing around them. Why is this so? Because there is something thereon that interests them, and in just the same way factory hands in the shops will become interested when they find upon the shop bulletin board something that always pertains to the source of their own and family's bread and butter. I am sure that when the men become interested in the way I have suggested, production will be greater and better, tons of steel that now go to the scrap heap will be saved, fuel oil consumption will decrease, the hammers will cease to oscillate unnecessarily when no forging is being done, thereby saving coal for steam, the forgings will be placed directly from hammers and trimming presses into trucks and wheel barrows instead of on the forge floor to be handled again unnecessarily, thus decreasing the labor cost. Many other troubles will also be overcome that at one time seemed impossible. Besides, in several months it will be found that there exists in the forge shop from one end to the other among all the men a state of efficiency and economy that was never before known and due to nothing else but plain bulletin board Talks.

Protest Against Freight Rates

Seeking cancellation of certain southwestern freight tariffs, the traffic bureau of the Youngstown, Ohio, Chamber of Commerce has filed a petition with the Interstate Commerce Commission setting forth that new rates soon to go into effect on roads running out of St. Louis are in excess of those fixed by the commission last August. At the time the new rates granted were announced, the railroads were directed to publish tariffs on business originating in Eastern territory and destined to the Southwest, showing an increase of 33 1/3 per cent. This rate was made applicable to interterritorial business. In the Leeland tariffs governing Southwestern rates, it was found that many of them showed increases ranging from 34 to 38 per cent, instead of the 33 1/3 per cent allowed by the commission. The Southwestern inter-territorial rate affects tens of thousands of tons of pipe shipped annually from the Mahoning Valley to Oklahoma and Texas oil fields and also steel in other forms. The traffic bureau charges the rates are discriminatory.

The sales and order departments of La Belle Iron Works have been transferred from Steubenville, Ohio, to Wheeling, W. Va. Communications to these departments should be addressed to Wheeling. The purchasing, treasury and traffic departments remain at Steubenville.

Work was resumed in some departments of the plant of the Duquesne Steel Foundry Co., Coraopolis, Pa., Jan. 17, following a shutdown of several weeks. Operation of all departments will be resumed on Jan. 24.

The Automatic Products Corporation has succeeded the Tock Screw Machine Products Corporation, Long Island City, N. Y., taking over its assets and assuming its liabilities.

Pittsburgh Not Alarmed by Labor Union Plans

PITTSBURGH, Jan. 17.—The decision of the International Unions represented in the steel industry, in Washington last Thursday, to launch a new campaign to organize the iron and steel workmen throughout the country has occasioned only academic interest and very little concern among manufacturers in this district. In the absence from the city of Michael F. Tighe, president of the Amalgamated Association of Iron, Steel and Tin Plate Workers, and permanent chairman of the new committee, it is impossible to obtain any definite information as to when the new campaign will be inaugurated. Other officials of the organization declined to discuss the matter.

In iron and steel trade circles the revival of the organization campaign is regarded more in the nature of a threat rather than as a possibility. It is pointed out that in the readjustment now going on, labor must contribute its share to the restoration to the normal peace time conditions and the drive to unionize the iron and steel plants is thought to be for its effect upon action of the steel companies with regard to wage cuts. Much significance is attached to the quoted statement in dispatches from Washington of one member of the committee, who stated it was not the intention of the new organization to conduct strikes but only to participate in legitimate organization work in steel plants.

Cutler Steel Co. Organized

The Cutler Steel Co., Pittsburgh, has been incorporated under the laws of Delaware and will take over the plant of the Thomas R. Heyward Co. at New Cumberland, W. Va. This plant, which has been producing steel castings with an annual capacity of about 10,000 tons, was built in 1916 and owned by the National Steel Casting Co. It was acquired by the Heyward Steel Co., Pittsburgh, organized to take it over, in 1918. In the same year it was sold to the Amalgamated Machinery Corporation, Chicago, and in August, 1919, was acquired by Thomas R. Heyward, Jr.

The Cutler Steel Co., which is a closed corporation in which Mr. Heyward is largely interested, will produce alloy steel bars and billets and high carbon sheets, after the necessary changes and additions have been made to the New Cumberland plant. A New York branch of the company has been opened at 50 Church Street in charge of W. H. Waddington.

Almanac of Italian Chamber of Commerce

The Almanac of the Italian Chamber of Commerce for 1921 containing 244 pages is now available for exporters, importers and others interested in trade with Italy. Included in the information which the book contains is an article by Engineer Giuseppe Beliggo of the Royal Polytechnic Institute, Milan, on the "Present and Future of Italy's Industry"; statistics on area, population, provinces, and locations of chambers of commerce in Italy; postal, cable and freight regulations and rates; passport information, lists of prohibited imports of both Italy and the United States and instruction on how to make a shipper's export declaration. The almanac is published in both Italian and English and is available through the Italian Chamber of Commerce, 99 Hudson Street, New York.

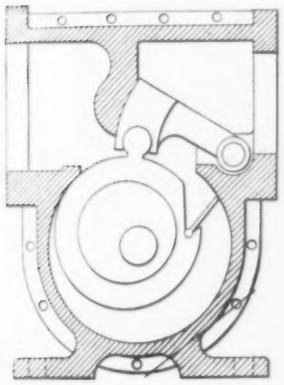
American Steel Foundries Earnings

The American Steel Foundries showed gross sales of $60,000,000 in 1920, according to late advices. Net earnings applicable to dividends, after liberal writing down of inventories, depreciation, etc., interest and federal taxes, are estimated at $5,000,000 for the year, or about $7.50 a share on 612,000 shares of common stock, after allowing for preferred dividends. All of the nine plants of the Griffin Wheel Co. and seven of the nine plants of the American Steel Foundries are now in operation. Operations are not at capacity, however, in many instances.

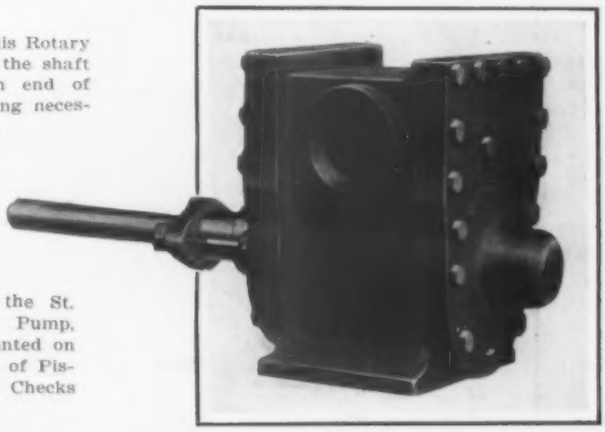
Rotary Piston Pump

A rotary piston pump for the handling of volatile and non-volatile liquids has been developed by the St. Louis Pump & Equipment Co., St. Louis. The pump has only 12 major parts—pump case with dividing partition, two end plates, a steel shaft with two eccentrics mounted thereon, two pistons, two rocker arms and two checks.

A shaft passes through the center of each of the two chambers or cylinders. Two eccentrics, directly opposite in throw or 180 deg. apart, are mounted on the shaft. Surrounding these eccentrics are the two pump pistons which are pivoted to the rocker arm, thus serving to produce the reciprocating movement of the piston through the cam action of the eccentrics. This gives a composite reciprocating and rotary motion of the pump plunger or piston without actual contact of the piston and cylinder walls. The clearance, however, it is pointed out, is so small that a liquid seal results, and so positive is its action that after long service it pulls better than 29 in. of vacuum.



Elevation Drawing of the St. Louis Rotary Piston Pump, Showing Eccentrics Mounted on Shaft, and the Location of Pistons, Rocker Arms, and Checks



Photograph of the St. Louis Rotary Piston Pump. Note that the shaft does not extend through end of pump case, thus eliminating necessity of packing

The piston check is the only moving part touching the cylinder wall, and this functions only at the point of transition at the end of the pumping suction movement or stroke to the beginning

The wear on this check is taken up automatically. The interval between the so-called strokes is so slight, it is explained, that an even impulse is imparted to the liquid handled. While the piston is discharging, it is acquiring fresh liquid on the opposite or suction side, and the piston in the opposite chamber is functioning conversely, thus giving balanced action.

The construction, it is stated, is entirely of metal most suitable for the liquids handled and so arranged that no two similar metals are in contact at any bearing point. All wearing parts are rotative and at points where wear may be encountered self-lubricated bearings are used.

The head at one end of the pump case is blind, that is, the shaft does not extend through, thus eliminating packing. At the other end, a gland which holds the packing material, is bolted to the head. This gland is separate from the bearing bushing. The pump is stated to be practically free from vibration and is self lubricating.

Fatigue Phenomena of Metals

What is styled as a good example of the possibilities of the engineering division of the National Research Council is the work of its committee on the "Fatigue Phenomena of Metals." Although fatigue failures of metal parts subjected to rapidly alternating stresses have been recognized for many years, the recent era of high speeds has yielded cases of great number and importance—in steam turbine shafts and rotors, airplane engine crankshafts, hulls of steel ships, axles and shafts of railroad cars, motor cars and trucks and many machine parts. To pursue investigations, Engineering Foundation made a grant of $15,000 a year for two years. The experimental work is being done at the University of Illinois, through its engineering experiment station, under the joint auspices of the division of engineering, the Engineering Foundation and the University of Illinois. The university furnishes certain services, laboratory space and other facilities, a contribution equivalent to about $6,000 a year. In the summer of 1920, the General Electric Co. agreed to contribute an additional sum of $30,000 for an extension of the work to include 3 per cent and 3½ per cent nickel steel, placing no restriction on the publication of the results.

Although the nickel steel results will be of immediate commercial value to the General Electric Co., they will also be useful to other manufacturers. "The attitude of the company is, therefore, unusually broad-minded," as a National Research Council report says. "Great economies will result from the co-operation, because the facilities, the supervising experts and much of the apparatus are already available and the consulting services of a group of the foremost experts are furnished without cost, the chief additional expenses being for some additional apparatus and junior assistants."

The co-operative method with its concentration of talent is emphasized as making likely the discovery of the fundamental laws of fatigue, which will be vastly more valuable than the empirical information as to the fatigue limits of a few varieties of steel. There is basis for belief that as soon as the present investigations begin to yield results others interested, notably the automobile industries, will be aroused to joining the General Electric Co. in providing financial support for the continuation of the important research.

In this investigation industry has a demonstration of the feasibility and economy of co-operative research, but also of the services which can be rendered by the engineering division of the council in organizing such projects and by Engineering Foundation in supporting them until they have demonstrated their value sufficiently to command wider support.

Improvements at Dover Furnace

Extensive improvements will be made to the Dover blast furnace plant of the Hanna Furnace Co., Dover, Ohio, which went out of blast recently for repairs. Three new 22 x 100 ft. stoves will be built and probably the furnace will be relined. In the power house there will be installed five 2000 hp. Wickes water tube boilers and a new power unit consisting of a General Electric 750 kw. mixed pressure generator, driven by a De Laval steam turbine. The turbine will take the place of two reciprocating engines which will be used hereafter as spare equipment. A Mesta barometric condenser will also be provided. A new pump house will be built and equipped with condenser pump, service pumps, etc. A warehouse will also be erected.

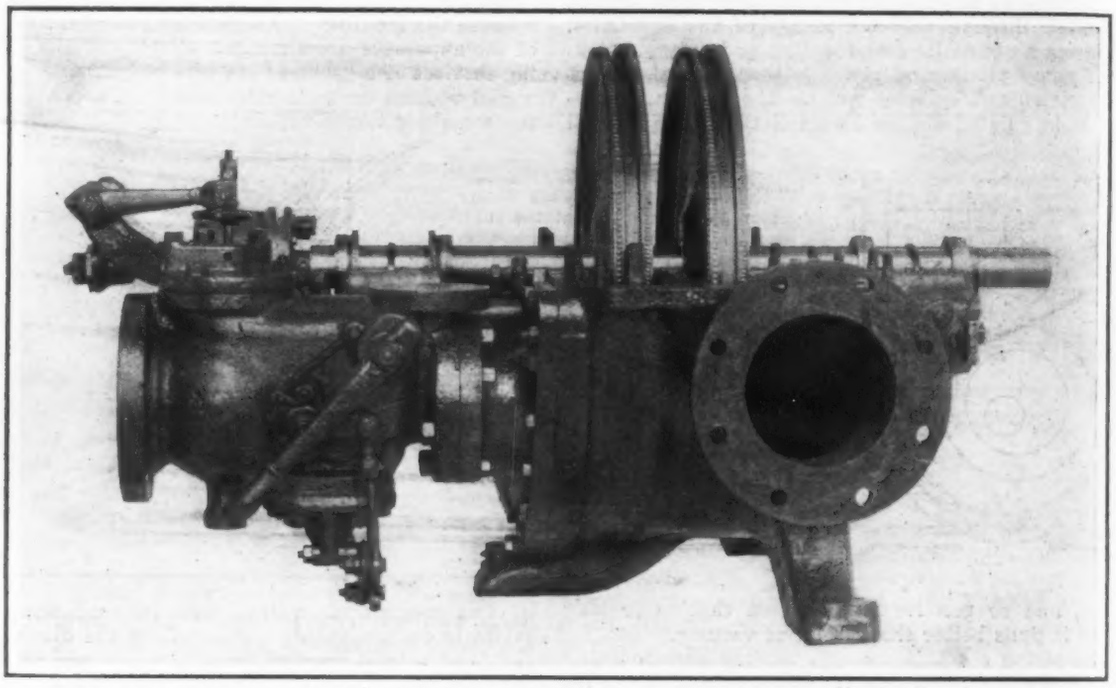
The annual Christmas party of the Pawling & Harnischfeger Co., Milwaukee, Wis., manufacturer of cranes and hoists, was held Dec. 21. A majority of the 1100 employees of the company, most of whom have had from 10 to 20 years of service, were present. There was a short address by Henry Harnischfeger, president, and among the numbers on the program was a concert by the employees' band.

Curtis Steam Turbine for Blowers

A new turbine of the Curtis type suitable for driving such apparatus as blast furnace and converter blowers, centrifugal air compressors and exhausters for oil, gas, or powdered coal furnaces has been developed by the General Electric Co., Schenectady, N. Y. The turbines are of one, two, or three stages, and operate at steam pressures of from 50 to 300 lb., with or without superheat, and either condensing or non-condensing. The top of the casing can be readily raised for inspection or removal of the wheels, without disturbing the steam connections.

The turbine is equipped with speed control in the form of a centrifugal governor, and if desired an emergency governor. The first is of the centrifugal tension spring type, the motion of the weights being transmitted through ball bearing connections to the governor valve. The speed may be adjusted while the turbine is running by operation of the governor valve. The emergency governor, if attached, operates independently of the main governor, when the speed rises to about 15 per cent above normal.

The steam passes through the first stage nozzles from the steam chest, the nozzles being opened or closed, as required, by hand valves placed in the steam chest. The governors control the flow of steam to all nozzles.



Type L Curtis Steam Turbine with Top Half Removed. It is built in one, two or three stages

Conservative Buying at Seattle

SEATTLE, Jan. 15.—The Steel Corporation prices are generally being accepted through this territory as final for the earlier months of the New Year, although several of the larger jobbers are not ready to buy on that basis. It is the view of the conservatives that with spring building commitments in view the independent companies will make no more reductions. Jobbers are now well stocked for 60 days.

The continued bulk movement by the intercoastal water routes of steel pipe and sheets is causing transcontinental railroad traffic officials some anxiety. Efforts have been made to induce carriers in the Central Freight Association and Atlantic seaboard territory to share in a reduction in rates on lumber moving east because of the heavy loss of tonnage in steel westbound, but so far these requests have met with little encouragement.

The Ready Steel Products Co., that bought the steel from the Todd shipyard, valued approximately at $4,000,000, is about to throw this stock on the market. The bulk of these holdings consists of bars and plates.

It is regarded as probable that there will be a fair demand this spring for modern logging machinery, as the bulk of the machinery now in use in the forests of the West Coast timber section is antiquated, that is, it is more than eight years old and must now be replaced.

German Competition in Sweden

As an example of the effect of the depreciation of German currency upon Swedish industry, it is stated that a German engineering firm recently offered goods for delivery in Sweden at the price of 48,000 kronen, and secured the order in competition with a Swedish firm which had quoted 60,000 kronen, says the London *Ironmonger*. Converted into German currency the German firm received 685,000 marks. As the purchasing power of the mark in Germany is alleged to be nearly three times as high as the value of the mark in Sweden, the German firm received an effective payment equal to 137,000 kronen, and yet the Swedish offer at 60,000 kronen was too high. It is further pointed out that the present price of Swedish bar iron is 48 kronen per 100 kilos, at makers' works. German bars can now be purchased at 26 kronen per 100 kilos. at Swedish ports. This price corresponds to 3.70 marks, which, according to the purchasing power of the mark in Germany, represents 74 kronen, and German makers consequently get about 50 per cent more for their bars in effective value than the Swedish makers.

The Trumbull Steel Co., Warren, Ohio, has started three of its open-hearth furnaces, all seven of which have been idle for over two months. In the meantime accumulated bar tonnage has been worked off and an accumulation of small orders required resumption of the steel-making units.

Tests of bond resistance between concrete and steel, studied by the Bureau of Standards, Washington, are reported in technologic paper No. 173 of the bureau, now ready for distribution.

The United States Engineers Office, Louisville, Ky., is calling for sealed proposals to be received until 2 p. m., central time, Feb. 16, for furnishing and delivering steel barges according to designs to be had from that office.

Victory E. Rehr, formerly vice-president and general manager Aetna Foundry & Machine Co., Warren, Ohio, has opened offices in Warren as a manufacturers' sales agent, and will devote his attention to power plant equipment.

CONTENTS

ESTABLISHED 1855

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Correctives to High Prices

It became clear, after the armistice, that commodity prices and wage rates could not return, at least in any short period of time, to pre-war levels, because the volume of currency, of credit, of securities available as collateral and of liquid capital generally, had greatly increased. It has now become equally clear that it is impossible to decree that the dollar has had its purchasing power reduced by a certain amount and then have all commodity prices, wage rates and charges for all sorts of services adjusted precisely to that altered value.

Apart from all theory, there are two proofs, furnished by actual practice or experience, that the theory of the depreciated dollar was used to account for too much. One is that prices of various commodities advanced by widely different amounts, yet the purchaser's dollar was the same dollar. The other proof is that the prices did not stay up.

The question why prices went up affords room for very interesting studies, but of more direct interest at the moment are the reasons for their coming down, for every one would like to know how far prices will come down and whether they will stay down.

An important point is that there are certain correctives to high prices. Two classes may be mentioned—those that are psychological, working through men's minds, and those that represent fixed influences of a material character that in the long run cannot be downed or argued away.

As to psychological influences, there is the well known one that one price advance begets another, and so on until necessarily the whole structure topples of its own weight. When sugar was advancing, consumers became fearful that eventually it would be unobtainable, and so they started to accumulate, their buying encouraging further advances. In the lower price ranges of a commodity the sellers, as a rule, recognize the danger of their market being spoiled by an inordinate advance, with eventual disorganization, and hence, they are disposed to hold prices within moderate bounds. Once they see the danger limit has been passed they feel that conservatism will do no good and accordingly they proceed to make the most of the situation.

As to fixed influences, several of great importance may be mentioned. There are the billions of dollars face value of bonds, whose holders receive only a fixed income. Wage rates, the prices of wheat, copper and other commodities may all be doubled, but the income from bonds is not increased. Then there are the relatively fixed incomes for personal services, from the salary of the president of the United States down to that of the country school teacher. There are the values of real estate, which may increase but would not increase in proportion to wage rates and commodity prices unless every one became absolutely convinced that the high level would remain for very many years. Had everything been given a horizontal advance, whether of 50 per cent or 100 per cent or any other amount, conditions would have been different; but some things could not be so advanced and others were not. These things have acted as a corrective.

Bureau of Standards and Steel Research

The annual report of the United States Bureau of Standards emphasizes anew the scope and value of the work which this organization is doing. To the steel industry the results of its research are vitally important. Many branches of steel metallurgy are involved, including high-speed and high phosphorus steels, rolling mill practice, zirconium and special steels, properties of arc welds, a study of railroad materials and so on. The bureau's investigations in the field of heat treatment have been outstanding in the past, particularly its exhaustive results in pyrometry. Present studies on the effect of heat treatment on the physical properties of various plain and alloy steels promise equally valuable data. Of unusual interest should be the results of 300 and more static tests of steel at high temperatures.

Director Stratton cited the resignations during the year of several competent assistants, in some cases seriously handicapping certain investigations. He emphasized the unusual importance at present of such research work "because American industries have taken up the manufacture of products which before the war were produced entirely in Europe." It is essential that these industries be given every chance to meet foreign competition and the director rightly urges that they should be kept informed on all the latest scientific developments in manufacturing processes.

It can only be regretted that this plea has

fallen on unappreciative ears. The appropriations committee of the House, at a hearing last week, was even more insistent than last year on reducing the bureau's allowance. While economy should be the aim in all Government expenditure, there is a penny wisdom and pound foolishness that is likely to find fresh examples in the action that will be taken on various lines of work now under review at Washington. The Bureau of Standards should be able to hold in its employ the capable men who are now being solicited to enter industrial positions. Problems in metallurgy and in other fields must be attacked in the knowledge that never has European effort in these directions been more strongly backed by Government aid. While domestic research under private or association auspices is under way in a number of lines, it has always been true of the work of the Bureau of Standards that its results have been made promptly available for the benefit of industry, whereas those reached in other channels have not always been released early if at all.

American Tin

The American tin industry has been growing. Previous to 1915 the smelting and refining of tin in the United States from foreign ores amounted to little. In recent years, however, there has been rapid expansion and to-day the American tin industry comprises one or two large plants and several small ones in which foreign tin ores, mostly Bolivian concentrates, are converted into high grade tin.

In 1916 only 3845 gross tons of tin was thus produced in the United States, while in 1920 the expansion was to 14,513 tons, or nearly fourfold. In 1916 American refined tin comprised only 6.4 per cent of the total deliveries into domestic consumption, but last year 22 per cent of the total deliveries were of tin made in this country.

American tin is being used in some cases where it was thought foreign brands only could be employed. Progress in electrolytic processes has made these results possible, for the domestic product is all tin refined electrolytically. Regardless of the fact that tin ore has never been found in the United States in commercial quantities, a tariff on tin for the protection of the Eastern seaboard smelting industry was advocated last week before the Ways and Means Committee at Washington. While the industry made its way in war time, with war prices prevalent throughout the world, it is argued that with the decline in prices under peace conditions the possibilities of disturbing competition call for consideration.

The part of the daily newspaper headliner in the making of public opinion is by no means insignificant. It has been said that he is as much a molder of opinion as is the writer of editorials. Certainly the newspaper headlines on labor controversies often create a bias in the mind of the reader. Why should it be necessary, in a difference between a manufacturing company and its employees, for the headliner to say that the company has "defied" the union or the union has "defied" the company? The fact often is simply that the employees have made a wage demand and the employer has asserted his inability to grant it. There was no defiance about it. On the other hand, after a period of poor business such as many industries have seen in the past six months, the employer offers a reduced wage scale. The headliner inevitably tells us that the employees, in asserting their unwillingness to accept it, have "defied" the employer. Does a buyer "defy" a seller when he tells him his price is too high? There is a responsibility for careful statement concerning wage disputes to which it must be said a good many newspapers have not risen. The effort seems to be, in so much that is published about labor troubles, to intensify what is represented as a state of war, and to embitter rather than to pacify.

Our Steel Making Capacity

The question "What is our steel-making capacity?" is always an interesting one. When demand is heavy it is desirable to know how much of it can be filled promptly. When demand is light, there is curiosity to know how much demand must grow before it can engage the capacity. It is not a simple matter to estimate the capacity now existing, for the reason that there has been no recent test of actual practice. Prior to November, 1916—and this is a fact that should be emphasized—the steel industry never had any particular difficulty in operating to capacity when it had the orders. Beginning with the month named, on the other hand, there has been a continuous run of serious difficulties except for one breathing spell (before the present) when there was a lack of orders.

Additions to steel-making capacity, as shown by the summaries of new construction gathered in the Annual Review numbers of THE IRON AGE, the last summary appearing on page 106 of the Jan. 6 issue, have been as follows, the figures referring to gross tons per annum of rated capacity:

1913.....2,920,000	1917.....4,326,999
1914.....1,215,000	1918.....1,945,000
1915.....1,405,000	1919..... 625,000
1916.....4,205,000	1920..... 675,000

In considering total capacity, reference will be made only to ingot capacity. The steel-casting industry is entirely separate. That there has been no close relation between capacity and production since 1916 is shown by the following statistics of actual ingot production 1916 to 1919, with an estimate for 1920:

1916.....41,401,917	1919.....33,694,795
1917.....43,619,200	1920.....40,000,000
1918.....43,051,022	

It is unnecessary to refer in detail to the various manufacturing difficulties that have been encountered since a coke scarcity, due to car shortage, developed in November, 1916. Suffice it to say that all these difficulties have been abnormal, nothing comparable having been previously experienced, and that in all probability such difficulties need not be reckoned with for the future, since business in the United States is getting down

to a solid basis and will probably only be active when it can be efficiently conducted.

The year 1916 was one of full and satisfactory production throughout, except for a slight curtailment in November and December caused by coke scarcity. Ignoring this item, and noting that the new construction of the year, 4,205,000 tons per annum of ingot capacity, fell chiefly toward the latter part of the year, Sept. 1 may be taken as an average date. On this assumption the new capacity of the year contributed 1,400,000 tons to the year's output, hence 40,000,000 tons of ingots were produced by the plants that had been completed by the beginning of the year. The new construction in the five years from Jan. 1, 1916, to date, amounts to 11,776,000 tons. The sum of the two items is 51,776,000 tons.

The question is whether a discount should be written from the rated capacities for the new construction, as supplied by the manufacturers, or an allowance should be made for increased production by the older plant facilities, according to the familiar practice of steel works of breaking their records almost every time a favorable set of conditions is freshly presented.

As a practical test of this question, let it be assumed that on Jan. 1, 1916, it was desired to estimate existing capacity. There had not been full operation since the latter part of 1913. Ingot production in 1913 was 30,280,130 tons. There was a slowing down in operations late in the year. A scrutiny of THE IRON AGE monthly blast furnace reports suggests that the output was only between 5 and 10 per cent less than capacity, as shown by the performance in the best months. The Steel Corporation's report for the year says there was an operation of Steel Corporation capacity of 88 per cent. It will be safe to take the output at 90 per cent of capacity, so that 100 per cent would have been 33,640,000 tons. To be on the conservative side again, the year's new construction is taken at July 1 for the average date, and adding one-half the new construction of 1913 and all the new construction of 1914 and 1915, as shown by the table above, one reaches a figure of 39,120,000 tons. With the knowledge available Jan. 1, 1916, that would have been regarded as too high rather than too low an estimate. Yet the outcome was a million tons more output than thus estimated.

Even though the steel industry has not been able to operate at capacity since 1916, it has learned lessons of efficiency and it is not an unreasonable assumption that when physical conditions permit it will be possible to produce more than the 51,776,000 tons of ingots indicated by taking actual production in 1916 and making an addition for the new construction. The total of rated capacities as given in the annual statistical report of the American Iron and Steel Institute, as of Dec. 31, 1919, was 53,193,905 tons, this, of course, not including the 675,000 tons of new construction in 1920, while there is new construction in progress amounting to 430,000 tons.

In the circumstances a safe working rule is to take ingot capacity at about 52,500,000 tons. A little test of this is furnished by the circumstance that production was shown to be at the rate of 45,000,000 tons last March, when there was some shortage of fuel and when labor was not altogether as plentiful or efficient as it may be expected to be in future. At 52,500,000 tons that would be 86 per cent of capacity, and at the time the mills scarcely estimated their percentage so high.

CORRESPONDENCE

Relation of the Country's Technical Literature to Industrial Research

To the Editor: The New York *Times* of Sunday, Jan. 9, in its editorial section had an interesting article on "Engineers Join in Research Work" with a subhead "Agencies Co-operate in Effort to Salvage Knowledge Gained in War."

While the aim of this article is to make known the co-operation of the several large engineering societies of this country in linking together their members into a vast potential force for the solution of the various problems confronting the manufacturer and scientist, it has left out a very important link in this chain of research. I refer to the library link.

We all know that to-day as never before scientists and manufacturers are depending more and more upon records of others as found in current print. Witness the growth of the service of the United Engineering Society, the generous response to the Chemists Club for increased funds, the expansion of the Technology room of the New York Public Library and most important of all the tremendous increase in special libraries organized since 1917 to aid large and small industries in the solution of their problems.

With the linking up of this vast supply of salvaged knowledge gained from the war with all that has been made available throughout past years what greater ally to industrial research could be found?

To go back to March 25, 1915, the *Engineering Record* published an article the text of which was: "There are to-day in this country a large group of engineering libraries of great value collectively but not suitably co-ordinated." This article finishes by saying that "to do the work would necessarily require considerable expenditure, but it would be time and money well spent."

It is not altogether unlikely that the following circumstance will be repeated many times. I have in mind a happening in a large industrial city where a large manufacturing concern had been experimenting on a special process, resulting finally in failure. One of the men working on this process was talking with the librarian of the city about it. A smile crept over the librarian's face as he told the man that "that very experiment had been tried out before and found a failure. We have a record of that failure right here in one of our books." So because this concern went ahead blindly they lost some thousands of dollars and were no further ahead.

So it goes and so it will continue to go—wasting thousands of dollars annually simply by failing first to find out whether or not the proposed process, operation or whatever it may be has ever been done before and if so what is the best way.

There are two ways that this library link can aid materially. The first is by publishing weekly an index of abstracts of articles in current technical papers. The second is the founding of a large central catalog of all technical books, pamphlets, trade catalogs and translations carefully analyzed for every item of value in them.

This proposed catalog would be a large undertaking but by no means unpracticable. A long start has been made in the library of the United Engineering Societies, in the Library of Congress and John Crerar Library of Chicago. This proposed library has its prototype

in the International Institute of Bibliography at Brussels which recently filed its 12 millionth card.

Additional co-operation could be gained by linking up the several hundred special libraries devoted to special industries by making them sponsors for picking out all items of pertinent value in their collections and sending copies of cards indexing these items to the proposed central catalog.

These two schemes for increasing research work of the future have been but briefly outlined. To some these two allies of research may seem remote and impracticable. The fact that the International Institute of Bibliography has existed even through war ridden days of Belgium long enough to file its 12 millionth card is indicative of the commercial possibilities of a similar scheme in this country where the machinery for its accomplishment is greater.

New York, Jan. 11. K. C. WALKER.

Will the Pig Iron Decline Go Further?

To the Editor: I have been much impressed lately in the reports coming to me from our salesmen and directly from our customers, by the fact that a large amount of engineering and kindred work is being held up by the general impression that the manufacturers of pig iron have been making enormous profits and can now afford to sell pig iron at much lower prices than are going at this time; and these users of castings are holding back orders with the idea of forcing the pig iron manufacturers to meet their views.

There was a much advertised letting of cast iron pipe last week. When the bids were opened they were all rejected. There were three other lettings lately at which all bids were rejected and one of the buying committee stated that they would not buy until pipe was offered at $40. This would mean pig iron at about $25 at the works of the buyer. On every hand we hear the view expressed that pig iron will go to $25.

How is this to be accomplished? In the first place let us look into the charge of profiteering. In October, 1920, a furnace manager with a furnace within 60 miles of Philadelphia made out for us the following cost data:

Furnace relining charge on basis of 6000 tons monthly	$0.50
Royalty or charge for interest on the investment	0.50
Labor and office expense	5.50
All Lake Superior ore	16.00
Coke, 1½ tons at $14 plus $3.64 freight	26.46
Limestone	1.60
	$50.56

Anyone familiar with manufacturing knows that an estimate made in this way is too low, because it does not take into account the almost daily mishaps and delays that always increase the cost. This estimate was based on the amount of coke that it would take to make 2 X foundry iron, and also taking into account that the coke was not good coke. All foundrymen know that they could not get good coke during the last summer and fall.

According to your own record (p. 56, Jan. 6), the highest monthly average price for 2 X iron in Philadelphia was $53.51 in September, 1920. It cost to deliver the above iron in Philadelphia $1.40 per ton. This left the above furnace $52.11 for manufacturing, selling, etc., or a gross profit of $1.55 per ton on $50.56 investment—about 3 per cent. Is this profiteering?

We have also seen the cost sheets for September of a furnace in Virginia that is notably the best handled and has probably made more money than any other, and the cost was $41.34. This furnace only used 2559 lb. of coke and 4089 lb. of ore to make a ton of pig iron, which we believe is as good practice as possible on 2 X iron.

Now how are these costs to be reduced? The furnace in Pennsylvania may be able to buy its coke at $6 at the ovens. With coal costing at least $3 at the ovens, it will take at least $4.65 worth of coal to make a ton of coke, and the labor cost will not be less than $1; so that would mean $5.65 for cost of manufacturing coke, and it cannot be done at that price. Granting that the furnace gets coke at $6 and granting that because of better coke they can make a ton of 2 X foundry iron with 2500 lb. of coke, this means:

Coke	$12.05
Relining charge will be the same	0.50
Interest or royalty will be the same	0.50
Ore cost might be, by picking up odd lots and cinder	14.00
Labor might be, at a 25 per cent cut	4.12
Limestone	1.50
	$32.67

From what other source are they to get economies to reduce costs? There is no selling cost nor any profit in $32.67. Allowing 2 per cent for selling and 8 per cent for profit, which I think the Government will allow, would mean that $36 at the furnace is rock bottom for pig iron in eastern Pennsylvania.

What makes this cost so much higher than the old level? Two things—labor and transportation. It takes

1¼ tons of coke
2 tons of ore
½ ton of limestone

3¾ tons of raw material, to make a ton of pig iron, using Lake Superior ores. The cost of assembling this material was advanced 15 per cent and then 40 per cent on that.

When pig iron cost $15 to make in the East, common labor around a furnace was on the basis of 15c. per hour and worked twelve hours a day with no overtime. Up to Jan. 1, 1921, common labor at eastern Pennsylvania iron furnaces was getting 44c. per hour for a ten-hour day, with time and a half for overtime. The best that any furnace hopes to do is to get its labor at 30c. and in some plants it will be 32c. to 35c. Labor is the basis of all costs in pig iron—cost of ore, coke, limestone and transportation, so that if you could make pig iron at $15 on 15c. labor, it would cost $30 on 30c. labor without increases in other things.

It seems to me if people will only study this thing over they will come to realize that present prices of pig iron are as cheap as they will be. The best proof of this is to look at your record of furnaces going out of blast. No furnace goes out of blast unless compelled to, because of the cost entailed in standing idle and blowing in again.

WILLIAM W. HEARNE.

Philadelphia, Jan. 14, 1921.

A Question as to a Quotation

To the Editor: In your issue of Dec. 30, 1920, you quote me as follows:

"Society to function properly must recognize that property has no right to exist."

This statement is entirely contrary to my views of property continuously and consistently expressed in my writings and addresses and therefore somewhat widely known. My position is and has always been that I want more property, not less, because I want more people to have it. Your readers should know that on the occasion to which your report refers I was pointing to a book of R. H. Tawney, the English economist, "The Acquisitive Society," as a type of the kind of work that church organizations ought to promote in economic research. I stated that Tawney was expounding the functional conception of society, namely, that all its institutions should perform some service function; that he made this the test of the institution of property and proceeded to discriminate between various forms of property according to their serviceability to society. Obviously by this test certain forms of property will cease to exist, as property in slaves and property in distilleries has already gone out of existence in this country. HARRY F. WARD.

Union Theological Seminary, New York, Jan. 13, 1920.

[The quotation above referred to by Professor Ward was a sentence from a report of the speech recorded by a stenographer supposed to be competent. THE IRON AGE accepted the report as correct. We do not, however, wish to question the truthfulness of Professor Ward's statement and are willing to give him the benefit of any doubt that may exist as to the correctness of the report. The controversy seems to be as to whether property rights in general are to be maintained or only certain forms of property which, in the opinion of Mr. Tawney, Professor Ward and others, stand the test of serviceability to society.—Editor THE IRON AGE.]

Iron and Steel Markets

READJUSTMENT SLOW

Buyers Look for Changes Which Require Time

Further Decline in Pig Iron—Railroads Specify Sparingly

With slightly better demand, with here and there a concession from the general price level, and with the average of mill operations somewhat less, the steel trade finds nothing significant in current developments. In all lines consumers expect lower prices, but recognize that time is a prime factor and that the readjustment is only in its early stages.

It is expected that certain independent mills which have operated at a lower percentage of capacity than others since the first of the year will have enough orders to make a better run for a fortnight, which in turn will be followed by another quiet period. Neither from jobbers nor from manufacturing consumers are orders coming indicating more than perfunctory filling in, pending real developments on the price problem.

The Steel Corporation's customers meanwhile are taking shipments on a relatively liberal scale, in view of the firm stipulations naturally accompanying sales made last year at $15 to $30 per ton below prices obtainable for like material at the time.

Though operating practically full in the Pittsburgh district and with 22 blast furnaces and over 80 per cent of finishing capacity active in the Chicago district, the Steel Corporation is busier in some products than in others. Its Fairfield, Ala., structural mill has shut down and there has been some irregular operation in one or two departments at Gary.

Generally the leading independent companies have been running at 20 to 30 per cent capacity. Two companies in the Chicago district have reduced wages for common labor to 38 cents per hour, with time and one-half for overtime above eight hours. Another company there has reduced common labor 20 per cent.

With few exceptions current sales and inquiries are of a size ordinarily negligible. A Central Western mill has taken 10,000 tons of plates for the Louisville & Nashville's hopper cars. For 166 locomotives pending, including 70 for the Union Pacific and 36 the Louisville & Nashville will build in its own shops, there is figuring on various forms of steel. A conspicuous structural item is 3000 tons of shapes for the Navy Yard at Philadelphia.

As in all periods of low demand, new publications are being made of steel transactions closed weeks and sometimes months ago. Rail orders reported from Pittsburgh this week are not new. There is even backwardness on the part of some lines in specifying on their rail contracts, leaving rail mills with lighter rollings than they had counted on for the winter months. Legislation authorizing payments of the millions the Government owes the railroads is called for by a situation already acute.

That sheets can be had at $1 to $2 per ton below the general level is not surprising and there are cases of quotations at mill instead of at Pittsburgh. Warehouses have reduced sheets, which are now $15 per ton above mill prices on blue annealed and $20 on black and galvanized, with freight added.

Fabricated steel business in December kept up the average of the last quarter of 1920, and the year with a total of 1,161,700 tons was by some 4000 tons better than 1919. The total for the last three months was greater than that for the first four of 1919, when the stagnation following the war was not yet broken.

The trend of pig iron prices is still downward and whenever the market has been tested, lower quotations have been made. A sale of 1500 tons of foundry grades at Pittsburgh was made at fully $1.50 below the quotation of the preceding week and still lower prices were named on resale iron. A recent considerable sale at Chicago, it now develops, was made at a lower price than announced at the time. In eastern Pennsylvania, a quotation of $28, delivered, on basic, or nearly $6 below the prices made at the last recorded sale, failed to develop an order. An interesting illustration of Steel Corporation policy is furnished by the continuation of the quotation of $38, furnace, by the Tennessee company, which is $6 higher than the prevailing price. A few months ago, the $38 was $4 lower than the price of the independent furnaces in Alabama.

The issue on ore freight rates has been joined by a move on the part of the four railroads carrying iron ore from the old ranges of Lake Superior to upper lake ports for advances of 10 to 15 cents per ton. Already the iron mining companies have petitioned for a reduction in rates on all the ore roads, including those in Minnesota. In their inventories, blast furnace companies have marked down their iron ore on hand all the way from 50 cents to $1.50 per ton. Yet ore selling companies are not likely to announce the amount of the reduction in the price of 1921 ore for some weeks.

Orders have been received holding up shipments on the 15,000 tons of pipe for the oil line from Havre to Paris, placed last fall with the Steel Corporation, but the ultimate carrying out of the contract is expected.

Pittsburgh

PITTSBURGH, Jan. 18.

The readjustment of labor to the changed market conditions occupies the center of the stage in the iron and steel situation this week, although nothing in the way of actual wage cuts has so far developed in the important Pittsburgh district plants. The week, however, has seen a further decrease in active independent plant operations and in view of the wage reductions made in the East and the Middle West, it appears certain that at least as far as independent companies are concerned Pittsburgh cannot long remain out of line. Smaller units have effected agreements with their workmen calling for lower rates than previously were paid, but the larger companies appear to be deferring action pending a move in this direction by the Steel Corporation. No definite line is to be had on the probable policy to be pursued by the latter and in view of

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Jan. 18, 1921	Jan. 11, 1921	Dec. 21, 1920	Jan. 20, 1920
No. 2X, Philadelphia‡	$33.25	$33.25	$34.79	$44.35
No. 2, Valley furnace†	*31.50*	33.00	35.00	40.00
No. 2 Southern, Cin'ti†	36.50	36.50	42.50	43.60
No. 2 Birmingham, Ala.†	32.00	32.00	38.00	40.00
No. 2 foundry, Chicago*	*31.00*	32.00	34.00	40.00
Basic, del'd, eastern Pa.	33.86	33.86	33.86	39.25
Basic, Valley furnace	30.00	30.00	33.00	38.00
Bessemer, Pittsburgh	33.96	33.96	36.96	40.40
Malleable, Chicago*	*31.50*	32.50	34.50	40.50
Malleable, Valley	32.00	32.00	35.00	40.00
Gray forge, Pittsburgh	*32.46*	33.96	35.96	39.40
L. S. charcoal, Chicago	40.50	40.50	43.50	47.50
Ferromanganese	100.00	100.00	110.00	150.00
Rails, Billets, Etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$45.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	47.00
Bess. billets, Pittsburgh	43.50	43.50	43.50	48.00
O.-h. billets, Pittsburgh	43.50	43.50	43.50	48.00
O.-h. sheet bars, P'gh.	47.00	47.00	47.00	50.00
Forging billets, base, P'gh.	48.50	48.50	51.00	64.00
O.-h. billets, Phila.	49.24	49.24	49.24	59.10
Wire rods, Pittsburgh	57.00	57.00	57.00	60.00
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.70	2.70	3.85	3.75
Iron bars, Chicago	2.68	2.68	3.25	3.00
Steel bars, Pittsburgh	2.35	2.35	2.35	2.75
Steel bars, New York	2.73	2.73	2.73	3.27
Tank plates, Pittsburgh	2.65	2.65	2.65	2.65
Tank plates, New York	3.03	3.03	3.03	3.02
Beams, etc., Pittsburgh	2.45	2.45	2.45	2.45
Beams, etc., New York	2.83	2.83	2.83	2.82
Skelp, grooved steel, P'gh.	2.45	2.45	2.65	2.45
Skelp, sheared steel, P'gh.	2.65	2.65	2.65	2.65
Steel hoops, Pittsburgh	3.05	3.05	3.05	3.25

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Jan. 18, 1921 Cents	Jan. 11, 1921 Cents	Dec. 21, 1920 Cents	Jan. 20, 1920 Cents
Sheets, black, No. 28, P'gh.	4.35	4.35	4.35	4.60
Sheets, galv., No. 28, P'gh.	5.70	5.70	5.70	5.95
Sheets, blue an'l'd, 9 & 10.	3.55	3.55	3.55	3.55
Wire nails, Pittsburgh	3.25	3.25	3.25	4.50
Plain wire, P'gh	3.25	3.25	3.25	3.25
Barbed wire, galv., P'gh.	4.10	4.10	4.10	4.45
Tin plate, 100-lb. box, P'gh.	$7.00	$7.00	$7.00	$7.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$21.00	$21.00	$22.00	$36.00
Carwheels, Philadelphia	25.00	25.00	25.00	38.00
Heavy steel scrap, P'gh.	**16.00**	15.00	15.00	27.00
Heavy steel scrap, Phila.	14.50	14.50	14.50	25.00
Heavy steel scrap, Ch'go.	15.00	15.00	15.50	24.00
No. 1 cast, Pittsburgh	25.00	25.00	25.00	33.00
No. 1 cast, Philadelphia	**24.50**	22.50	22.50	38.00
No. 1 cast, Ch'go (net ton)	17.00	17.00	17.50	36.50
No. 1 RR. wrot, Phila.	20.00	20.00	20.00	34.00
No. 1 RR. wrot, Ch'go (net)	13.50	13.50	14.00	25.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$5.00	$5.00	$5.50	$6.00
Furnace coke, future	6.00	6.00	6.60	6.00
Foundry coke, prompt	6.50	6.50	6.50	7.00
Foundry coke, future	*7.50*	8.00	8.50	7.00
Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	13.25	13.25	13.75	19.50
Electrolytic copper, N. Y.	13.00	13.00	13.50	19.25
Zinc, St. Louis	**5.55**	5.50	5.75	9.30
Zinc, New York	6.00	6.00	5.75	9.65
Lead, St. Louis	**4.90**	4.85	4.60	8.50
Lead, New York	**5.12½**	5.00	4.60	8.75
Tin, New York	*34.75*	38.75	34.00	64.00
Antimony (Asiatic), N. Y.	*5.15*	5.20	5.50	10.75

The prices in the above tables are for domestic delivery and do not necessarily apply to export business.

the fact that its current obligations are sufficient for it to run practically full for the next five months, it is doubtful whether it will be the first to make a reduction in wages.

It seems to be the idea of the leading interest that the time to cross the bridge is when it is reached. Because of its present relative prosperity in the matter of live business and the fact that actual living costs have not gone down as much as the decline in wholesale prices indicates, the Steel Corporation evidently believes the time is not ripe for wage adjustments. It is realized, however, that buyers do not look upon the Industrial Board schedule on iron and steel as the ultimate minimums and that it is barely possible, before the present readjustment is entirely completed, competition on business may become so active that the Steel Corporation subsidiaries may be obliged to recede from their present quotations and this hardly would be possible on the basis of present costs.

Revival of the American Federation of Labor committee for the organizing of the iron and steel plant workmen is not viewed with much seriousness in this district, for there is plenty of evidence that when appealed to and the general economic conditions are fully explained, the workmen usually have preferred to work at a lower rate rather than go through a period of idleness. Throughout this district labor is showing a marked increase in efficiency and this development has tended to delay wage reductions.

Independent steel plant capacity is not over 20 per cent engaged this week. Only a small fraction of the steel making and finishing capacity in the Wheeling district is running while in the Mahoning and Shenango Valleys very little steel is being made. The Republic Iron & Steel Co. has all of its open-hearth furnaces and Bessemer converters down and among the other plants in that district the average of active steel making furnaces in operation does not exceed 30 per cent of the whole. Pipe mills, both of the Steel Corporation and the independents, are fully engaged. The Carnegie Steel Co. still has about 95 per cent of its ingot capacity in operation and has only a few of its rolling mills outside of the Sharon, Pa., works on the idle list. The National Tube Co. is running fully on standard and oil country pipe and there has been no let down from the recent gait of the American Sheet & Tin Plate Co. or the American Steel & Wire Co.

Suggestions of price reductions in steel continue to be heard, but usually verification is lacking. Not only are producers watching costs very closely but they hesitate about making concessions in the fear that in the present temper of buyers no business would result.

The pig iron market has been featured by a moderate flurry of buying in foundry grade, but the business has been done at least $1.50 a ton below the price of a week ago.

Scrap dealers have been obliged to slightly advance their prices in order to secure tonnage of desirable material.

Coke prices appear to have steadied for the present pending a decline in wages that would make possible a cut in producing costs.

Pig Iron.—The Standard Sanitary Mfg. Co. recently closed for about 1500 tons of foundry iron for its local plants, the business going to three Valley producers at $31.50, furnace, for No. 2 grade. Other sales direct from furnaces amounting to about 1000 tons in the ag-

gregate, also has been effected at the same figure. All of this iron is for immediate delivery. The price is $1.50 a ton below the nominal asking figure of merchant furnaces of a week ago, but does not measure the minimum price, as middlemen have lately moved in small tonnages a considerable amount of foundry iron on resales at about $30, furnace. Resale business has brought about a better distribution of stocks in consumers' yards than recently existed, while the sales made by the furnaces have permitted them to pull down somewhat their yard stocks. Almost no interest has been apparent in the steel making grades and no sales are reported except one of 500 tons of basic which brought $30, Valley furnace, the same price as is quoted on standard basic, and a resale of a small lot of Bessemer at around $28, Valley furnace. While the market probably would yield from present levels on the appearance of desirable business, it must be said that merchant producers generally regard prices to be as low as they can quote until there is an appreciable drop in labor costs all the way along from ore down to limestone. The furnace of the Struthers Furnace Co., Struthers, Ohio, has been blown out since a week ago and the Republic Iron & Steel Co. also has put another furnace on the idle list. The latter has now only three of its eight furnaces in the Valley making iron. These, however, are the largest and lowest cost producers.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$30.00
Bessemer	32.00
Gray forge	30.50
No. 2 foundry	31.50
No. 3 foundry	31.00
Malleable	32.00

Ferroalloys.—The market remains nominal on all ferroalloys in the absence of business, but the general trend of prices is lower. Domestic makers of ferromanganese now quite generally are quoting 76 to 80 per cent material at $110, furnace, freight allowed, for prompt and first quarter delivery. They have not, however, succeeded in booking any business at this price because of the presence of more or less resale material on the market, which is available at around $100, delivered. English makers are quoting $110 c.i.f., Atlantic seaboard, but this price is for average 80 per cent material as against average 78 per cent material offered by domestic producers. The English price is equivalent to $1.38¾ per unit of manganese and this being less than domestic unit price, there is actually little or no difference between the delivered price of English and domestic material. The market on average 20 per cent spiegeleisen does not now appear to be quotable at higher than $45 furnace, for resales have been done at $40 and on some 16 to 19 per cent alloy one maker recently made sales at well below $45. The appearance of the Steel Corporation in the market for its 1921 requirements of 50 per cent ferrosilicon appears to have strengthened the price ideas of makers, some of whom are quoting as high as $95 furnace, freight allowed, while others are not quoting below $90. It is doubted here that the Steel Corporation will pay these prices in view of the fact that for practically two years $80 has represented a fair average price for this material and no recent business has been possible, at least in this district, at above that figure. The recent reduction of $6.50 per ton in silveries and Bessemer ferrosilicon by Jackson, Ohio, producers has failed utterly to stimulate any interest on the part of buyers and the new quotations are no nearer a trading basis than the former ones. Actually buyers' bids are $5 or more a ton below what is now asked.

We quote 76 to 80 per cent domestic ferromanganese at $110 furnace, freight allowed; British, $110 c.i.f. Atlantic seaboard; resale tonnages, $100 delivered. We quote average 20 per cent spiegeleisen nominal at $45 furnace, on direct business and $40 for resale tonnages; 50 per cent ferrosilicon, nominal, $75 to $80 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson County and New Straitsville, Ohio, furnaces, as follows: 9 per cent, $54.50; 10 per cent, $58; 11 per cent, $61.30; 12 per cent, $64.60. Silvery iron, 6 per cent, $45; 7 per cent, $46.50; 8 per cent, $48.50; 9 per cent, $50.50; 10 per cent, $53; 11 per cent, $56.30; 12 per cent, $59.60. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Demands still are extremely few and exceedingly small. Business in finished lines is not improving to any considerable extent and the fact that sales are no longer possible at any premium over the March 21, 1919, schedules makes buyers rather indifferent about purchases even at the prices which the Steel Corporation is supposed to be quoting. The Steel Corporation bases are supposed to be $43.50 for 4-in. billets, $47 for sheet bars and $46 for slabs, but these prices are $5 per ton above Industrial Board levels and non-integrated manufacturers believe they should be able to buy semi-finished material at the March 21, 1919, basis. One development of interest in the market is the disappearance of the Industrial Board's differential on forging billets over those for rerolling purposes. The Industrial Board schedules called for $38.50 for rerolling billets and $51 for forging billets; now, independent makers are willing to take business in forging billets at an advance of $5 per ton over the rerolling billet basis. This means not more than $50, as the highest quotation now being made by any of the independent companies on rerolling billets is $45, and lately no sales have been done at that figure. The Steel Corporation price bases are usually indefinite at present because it has not been taking on much new business, but rather has been endeavoring to apply unshipped tonnages against the first quarter requirements of those outside companies which it serves. Steel works capaciey outside of the Steel Corporation is not at all heavily engaged this week. All of the Bessemer and open hearth capacity of the Republic Iron & Steel Co. is idle this week and it is doubtful whether as much as one-third of the capacity of the other Mahoning valley plants is in operation. Steel works operations in the Wheeling district also are at a low ebb, among independent companies, and Pittsburgh independents have less than one-half of their open-hearth furnaces on.

We quote 4 x 4-in. soft Bessemer and open hearth billets at $43.50; 2 x 2-in. billets $45.50; Bessemer and open hearth sheet bars, $47; slabs, $46; forging billets, ordinary carbons, $48.50 to $51, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—All makers still are quoting a base of $57 for soft rods but are making few sales. Non-integrated companies being unable to obtain any advance over the March 21, 1919, prices for finished wire products, feel that they should be able to obtain rods at $52, which was the Industrial Board schedule. Prices are given on page 232.

Plates.—Demand is quite as inactive as it has been for some time. The Steel Corporation seems to have the bulk of current live business and consequently is running its mills much more fully than the independents.

We quote 25 to 45 lb. sections from 2.45c. the price of the Carnegie Steel Co., to 3c., the price of independent makers, rolling from new steel. Standard rails, $45, mill, for Bessemer, and $47 for open hearth sections.

Structural Material.—There has been no improvement in business and about all that is coming to the fabricating companies in the way of orders is small tonnages for immediate delivery against projects that must go forward. Sentiment is a little more cheerful, for although money still is scarce and high, the fact that office building owners are increasing rents anywhere from 20 to 50 per cent is considered as likely to stimulate the construction of new buildings. The railroads are evincing very little interest in the market and the tank builders have not been so poorly off in the matter of orders in some little time as they are at present. The structural mills are running out of orders and are promising comparatively early delivery against such inquiries as are coming out. Steel Corporation mills are still well engaged, but the backlog of unfilled orders is rapidly melting away. Fabricating companies are not inclined to anticipate their requirements, presumably because they expect prices to be lower before they are higher. Prices are given on page 232.

Iron and Steel Bars.—New demands in both iron and steel bars are at a minimum and independent capacity is poorly engaged. A further reduction of $5 a ton has been made in refined iron bars, which now are quotable at 3.50c., base, in carloads, and 3.75c. in less

than carloads. Hardly enough demand is coming out for steel bars to determine whether the independent makers would shade the present price of 2.35c. The Carnegie Steel Co. is running practically full on bars and is experiencing little trouble in obtaining shipping instructions, although the automobile manufacturers are not yet releasing much suspended business.

We quote steel bars rolled from billets at 2.35c.; reinforced bars, rolled from billets, at 2.35c., base; refined iron bars, 3.50c., in carloads, f.o.b. mill, Pittsburgh.

Wire Products.—Very little activity is observed either as regards business or plant operations. The American Steel & Wire Co. is maintaining a rather high rate at its plants in this district, but is stocking no small part of its current production. Actual independent capacity does not average much in excess of 25 per cent. Most of the independent companies are supplying current demands from stock. Outside of a report that the leading interest is not always insisting upon the extra $5 per ton for annealing wire, there are no suggestions of price concessions.

We quote wire nails at $3.25 base per keg, Pittsburgh, and bright basic and Bessemer wire at $3.25 base per 100 lb., Pittsburgh.

Steel Rails.—Newspaper accounts that the Carnegie Steel Co. had taken substantial orders for rails from the Norfolk & Western, the Baltimore & Ohio and the Buffalo, Rochester & Pittsburgh railroads are stated to refer to contracts negotiated several weeks ago. Demand for light rails is on a much smaller scale than it was in the latter part of 1920. The Carnegie Steel Co. is not taking much business, as its present bookings preclude the promises of delivery until after July 1.

Nuts, Bolts and Rivets.—The rivet market is now $4 per 100 lb. for button-head structural rivets, and $4.10 for cone-head boiler rivets, or $5 a ton below last week's quotation. Bolts and nuts are holding fairly well in price, not that the demand is any better than it has been, but because present prices are regarded by makers to be as low as they can go on present costs. Some makers are getting a few small releases against suspended orders from the automobile companies. Prices and discounts are given on page 232.

Spikes.—Fairly good demand is noted in small spikes, but standards are dull and the bulk of current production is going into stock for later demand. Some makers of standard spikes still are quoting 4c. base, but the more general quotation is 3.65c., and that figure is regarded as high in some quarters, in view of the fact that the price based on the Industrial Board bar schedule was 3.25c. Prices are given on page 232.

Hot-Rolled and Cold-Rolled Strips.—No material improvement is noted in the demand and only a comparatively small amount of suspended business is being released. Makers are averaging about 50 per cent operation, but this is admitted to be a rather high rate, based on actual business now before them. No change is noted in prices, all makers quoting 3.30c. base for hot-rolled and 6.25c. base for cold-rolled, but in the lack of important demands these prices must be said to be nominal and untested.

Iron and Steel Pipe.—Full operations are reported by practically all of the independent makers of steel pipe, while the National Tube Co. is operating at capacity in all plants save those engaged on seamless tubes and boiler tubes. Recent reductions to the schedules of the National Tube Co. by the independents appear to have brought in a good many releases against suspended orders, but new demands lately have been rather light, as buyers seem to expect further reductions. Thus far the makers of wrought iron pipe have not changed their prices and as a result buyers are specifying carefully with an idea of securing full advantage of any reductions that may be made later. Orders have been received holding up the shipment of the line pipe placed for export to France a few weeks ago, but it is not believed the business will be canceled. Discounts are given on page 232.

Cold-Finished Steel Bars.—There is no improvement either in the demand or in specification against unshipped orders. All makers are holding to the base of 3.60c. but this is rather an untested price in the absence of business.

Hoops and Bands.—All makers are quoting a base of 3.05c., but are not getting any orders nor are suspended tonnages being released with any considerable freedom.

Sheets.—The American Sheet & Tin Plate Co. again last week had 95 per cent of its sheet mills in operation, making six weeks running that this company has averaged more than 90 per cent operations of this class of mills. Although this company's new business is somewhat below normal of the past few years at this time, new orders steadily are gaining and in addition it continues to get a good many releases against suspended tonnages. The story as far as the independent companies is concerned is the reverse of that of the leading interest. Independent sheet mill operations are hardly 25 per cent and orders and releases against suspended orders are few and small. As a rule, the Steel Corporation price schedules are being closely observed by the independents, although it is reported that a large maker of metal roofings recently was quoted a price of 4.10c. base on a good-sized tonnage of black sheets, or $5 a ton below the recognized market base. It is rather doubtful, however, whether there will be very much price cutting for the present, especially by the companies which have to buy their sheet bars, for on present prices of bars and current labor costs there is no profit at the Steel Corporation bases, let alone at lower figures. Prices are given on page 232.

Tin Plate.—The market still is stagnant and there are no very strong hopes of improvement during the remainder of this month. Makers are hopeful, however, that soon after the turn of February business will begin to pick up, as specifications against April shipment have to be made 45 days in advance. Container manufacturers now have ample stocks of tin plate to meet their probable requirements to April 1. The McKeesport Tin Plate Co., yesterday, started up 20 of its 44 mills. Although most of the other independent capacity in this district is idle, the average of operations is somewhat higher than it was a week ago due to the resumption by the McKeesport company. The American Sheet & Tin Plate Co. last week had about 82 per cent of its tin plate capacity in operation. Rumors have been common that less than $7 per base box was being done, but confirmation is lacking and there is a tendency to ascribe such reports to the container makers who are making strong efforts to secure lower prices. There have been suggestions that the present price of tin plate was to blame for the current high cost of canned foods. As a matter of fact, a reduction of 50c. per base box in the price of tin plate, which is said to be impossible on current steel and labor costs, would allow a reduction of only ⅛ of a cent in the price of a 2-lb. can.

Coke.—A slightly steadier tone has developed in the market here, not that demands are any heavier than they have been, but rather because oven operators have brought down production to about the point of actual consumption. Since $5 per net ton oven represents actual cost with a number of the smaller producers, there is a disposition to hold at recent prices, pending a revision in labor costs. Some of the Connellsville operators have been able to secure concessions from their miners, but until some action is taken by the H. C. Frick Coke Co., no general lowering of mine and oven labor is likely. The spot market on furnace coke is quotable from $5 to $5.50 per net ton oven, on new production, but there have been sales at well under $5 of tonnages loaded upon cars which had to be moved to escape demurrage charges. On the other hand, producers of well-known brands are asking $6 against

(*Continued on page* 230)

Chicago

CHICAGO, Jan. 18.

Consumers of iron and steel exhibit very little interest in the market and new bookings of mills and furnaces are few and far between. Inquiry is so light that prices remain untested. Here and there signs of weakness are to be noted. A week ago, for example, shading developed in connection with a purchase of plates and shapes, and it is likewise reported that slight concessions have been made on wire products, track fastenings, bolts and nuts and cast iron pipe.

The ruling price on Northern pig iron has dropped to from $31 to $32, local furnace, for No. 2 foundry, and it has been ascertained that a large tonnage was sold some weeks ago at slightly over $30 base. Despite the wide disparity between delivered prices of Northern and Southern foundry iron, 1500 tons of the latter has recently been sold in this section at $32 base, Birmingham.

Detroit rejected bids on 9000 tons of cast iron pipe on the grounds that the present period of industrial readjustment has not been completed and commodity prices are due for further declines.

Independent producers in this section are commencing to reduce their labor costs. The Inland Steel Co. and the Steel & Tube Co. of America have cut wages for common labor to 38c. an hour, with time and one-half for overtime above eight hours. The new scale is that which was in effect between April and August, 1918. The Republic and Interstate companies have eliminated the higher rates which were applicable on overtime above eight hours and the latter interest has also cut the wages of common labor 20 per cent. The Wisconsin and Illinois Steel companies have not yet made any change in wage rates.

Iron and steel production is on about the same scale as a week ago. The leading independent's capacity remains idle except for two blast furnaces, but the Illinois Steel Co. continues to operate 22 blast furnaces and about 80 per cent of finishing capacity, while the Wisconsin Steel Co. is running two out of three furnaces and about 60 per cent of rolling capacity. At the present rate of new bookings, even these two producers will be forced to curtail output sooner or later.

Ferroalloys.—Buying is still in small volume and the presence of resale material prevents the stabilization of prices. Ferromanganese has been recently sold at from $90 to $95, delivered, while spiegeleisen is available at from $45 to $47.50, delivered.

We quote 75 to 80 per cent ferromanganese, $90 to $95 delivered; 50 per cent ferrosilicon, $80 to $85 delivered; spiegeleisen, 18 to 22 per cent, resale, $45 to $47.50 delivered.

Pig Iron.—Pig iron sales are few, although occasionally a fair sized tonnage is booked. One purchase of 300 tons of foundry and another of 100 tons of high silicon foundry have been made at $31 base, local furnace. Although less resale iron is being offered than late in December, it is still available in round lots. Two hundred fifty tons of resale No. 1 foundry is on the market at $33, local foundry, or $31.75, base, for No. 2 material. It has become apparent that the large purchase of foundry and malleable reported in this column some weeks ago was closed on the basis of slightly over $30 base, furnace, for No. 2 foundry. As the tonnage involved was attractive, it is not clear that iron could be purchased generally on as favorable terms to-day, but recent sales of both furnace and resale material indicate that the present market level on Northern product is from $31 to $32 base, furnace, for No. 2 foundry. Southern iron has not found a market in this territory for some time because of the disparity between delivered prices on Southern and Northern material. Two producers are known to have quoted $32 base, Birmingham, on a recent attractive inquiry without securing any business. On the other hand, approximately 1500 tons of Southern foundry has been bought in this section within the past few days at $32 base, Birmingham. The lowest furnace price on 7 per cent silvery is equivalent to $46.53, Chicago, but a carload of 8 per cent resale was recently bought here at $45.82, delivered.

The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace and do not include a switching charge averaging 70c. per ton:

Lake Superior charcoal, averaging sil. 1.50, deliv. at Chicago		$40.50
Northern coke, No. 1, sil. 2.25 to 2.75	$32.25 to	33.25
Northern coke foundry, No. 2, sil. 1.75 to 2.25	31.00 to	32.00
Northern high phos	31.00 to	32.00
Southern coke, No. 1 foundry and No. 1 soft, sil. 2.75 to 3.25		41.67
Southern coke, No. 2 foundry, sil. 2.25 to 2.75		39.92
Southern foundry, sil. 1.75 to 2.25		38.67
Malleable, not over 2.25 sil	31.50 to	32.50
Basic	31.00 to	32.00
Low phos. Eastern furnace (copper free)		40.00
Silvery, sil. 7 per cent	46.53 to	51.82

Rails and Track Supplies.—The inability of the railroads to secure the money owing to them by the Government and the falling off in freight traffic and revenues have adversely affected the market for track accessories. There is little inquiry and some roads have decided to postpone action on inquiries previously issued. The Santa Fe has bought several thousand tons of tieplates at $1 a ton less than the prevailing price of 3c., Chicago.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails, 2.45c., f.o.b. makers' mills.

Standard railroad spikes, 3.65c., Pittsburgh. Track bolts with square nuts, 4.60c., Pittsburgh. Steel tie plates, 3c., and steel angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron, 3.25c., f.o.b. makers' mills.

Bars.—There is a dearth of demand for all classes of bars whether iron, mild steel or rail carbon steel.

Mill prices are: Mild steel bars, 2.35c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 2.68c., Chicago; rail carbon, 2.60c. to 2.75c. mill, nominal.

Jobbers quote 3.48c. for steel bars out of warehouse. The warehouse quotation on cold rolled steel bars is 5.25c. for rounds and 5.75c. for flats, squares and hexagons, an extra of 15c. per 100 lb. applying to orders exceeding 1000 lb. and under 2000 lb. and an extra 35c. on orders up to 1000 lb. Jobbers quote hard and medium deformed steel bars at 3.48c. base.

Structural Material.—Building construction is at a low ebb, the only letting of fabricated steel reported being 183 tons awarded by the Arkansas Foundry Co. to the Vierling Steel Works for a trestle at Conway, Ark. The Chicago, Burlington & Quincy is in the market for 107 tons for two bridges and bids are being asked on 500 tons for a Masonic Temple at Tulsa, Okla.

The mill quotation is 2.45c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 3.58c. for materials out of warehouse.

Plates.—The market is exceedingly quiet and in the absence of business it remains problematical what turn the situation would take if attractive inquiries should appear. Possibly for a large tonnage some mills would again be willing to shade prices, but it does not appear that any producers are ready to open their books indiscriminately to all orders, small or large, at less than the Industrial Board basis. There is little new railroad car business in sight. The Louisville & Nashville inquiry for 2700 freight cars is still pending and local producers are also figuring on the steel for 2500 cars to be built at the Lenoir Car Works of the Southern Railway, the proposed construction of which has been previously noted in our columns.

The mill quotation is 2.65c., Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 3.78c. for plates out of stock.

Railroad Rolling Stock.—The Union Pacific is inquiring for 70 locomotives and 14 dining cars. The Southern Railway is in the market for 50 passenger coaches and 50 baggage and express cars and the Florida East Coast wants six passenger coaches.

Cast Iron Pipe.—Detroit rejected all bids opened last Monday and Tuesday on 9000 tons of cast iron pipe despite the fact that some concessions under prevailing prices were offered. Although the base price

of $55, Birmingham, was the basis of practically all bids, the range between high and low bidders on various sizes was about $1.50 a ton. Pipe from stock and pipe of different specifications were also offered, but without results. The Detroit Water Board in rejecting bids gave as its opinion that prices of pipe, though much lower than in 1920, are still higher than will obtain when the present period of industrial readjustment has been completed. This opinion, it stated, was based not only on a survey of conditions in Detroit and contiguous territory, but consultation with leading manufacturers and business men. Notwithstanding the action of the Detroit board, more pipe business is in prospect. Peabody, Kan., will open bids on 1100 tons on Jan. 27, and Spring Wells, Mich., will close on 120 tons on Jan. 25. A number of other inquiries are known to be about to be issued. .....

We quote per net ton f.o.b. Chicago, ex-war tax as follows: Water pipe, 4-in., $69.10; 6-in. and above, $64.10; class A and gas pipe, $4 extra.

Bolts and Nuts.—The demand is light and on such business as does develop sellers show a disposition to shade. There is little contracting, as buyers prefer to await developments. For manufacturers' prices, see finished iron and steel, f.o.b. Pittsburgh, page 232.

Jobbers quote structural rivets, 5.08c.; boiler rivets, 5.18c.; machine bolts up to ⅞ x 4 in., 40 per cent off; larger sizes, 30 off; carriage bolts up to ⅞ x 6 in., 25 off; larger sizes, 25 off; hot pressed nuts, square tapped and hexagon tapped, 35 off; blank nuts, 85 off; coach or lag screws, gimlet points, square heads, 45 per cent off. Quantity extras are unchanged.

Sheets.—Inquiry is light and while concessions in prices are reported to have been made, confirmation is lacking. Local independent capacity is still idle.

Mill quotations are 4.35c. for No. 28 black; 3.55c. for No. 10 blue annealed, and 5.70c. for No. 28 galvanized, these all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stock, No. 10 blue annealed, 4.68c.; No. 28 black, 5.73c. to 6c.; No. 28 galvanized, 7.35c.

Wire Products.—There continues to be some demand for nails, but on the whole the market is quiet. The leading interest is still operating at a normal rate, although new business falls short of the tonnage ordinarily booked at this season. A few buyers have released orders previously suspended. For mill prices, see finished iron and steel f.o.b. Pittsburgh, page 232.

Old Material.—As there is no business to test prices, quotations are nominal and unchanged. A few inquiries for cast scrap are current without resulting in orders. Railroad lists include the Baltimore & Ohio, 14,000 tons, the Rock Island 3000 tons, the Chesapeake & Ohio, 4000 tons, the Soo Line 700 tons, the Baltimore & Ohio, Chicago Terminal 600 tons, and the Monon 500 tons. The large Baltimore & Ohio offering includes 2000 tons No. 1 rerolling rails and 1700 tons of No. 2 railroad wrought.

Per Gross Ton	
Iron rails	$23.50 to $24.00
Relaying rails	37.50 to 42.50
Car wheels	21.00 to 22.00
Steel rails, rerolling	15.50 to 16.00
Steel rails, less than 3 ft	16.50 to 17.00
Heavy melting steel	15.00 to 15.50
Frogs, switches and guards, cut apart	15.00 to 15.50
Shoveling steel	15.00 to 15.50
Low phos. heavy melting steel	17.50 to 18.00
Drop forge flashings	12.00 to 12.50
Per Net Ton	
Iron angles and splice bars	22.00 to 22.50
Steel angle bars	15.00 to 15.50
Iron arch bars and transoms	22.00 to 22.50
Iron car axles	32.50 to 33.00
Steel car axles	16.50 to 17.00
No. 1 busheling	13.00 to 13.50
No. 2 busheling	9.00 to 9.50
Cut forge	13.00 to 13.50
Pipes and flues	10.00 to 10.50
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	13.50 to 14.00
Steel knuckles and couplers	14.50 to 15.00
Coil springs	18.00 to 18.50
No. 1 cast	17.00 to 17.50
Low phos. punchings	15.50 to 16.00
Locomotive tires, smooth	11.50 to 12.50
Machine shop turnings	7.50 to 8.00
Cast borings	9.50 to 10.00
Stove plate	18.00 to 18.50
Grate bars	13.00 to 13.50
Brake shoes	11.00 to 11.50
Railroad malleable	14.50 to 15.00
Agricultural malleable	14.50 to 15.00
Country mixed	10.00 to 10.50

Cincinnati

CINCINNATI, Jan. 17.

Pig Iron.—An inquiry for 3000 tons of foundry iron for the Louisville plant of the Standard Sanitary Mfg. Co., shipment to be made in January and February and one for 1000 tons for the Titusville plant of the American Radiator Co., shipment in 30 days, feature an otherwise dull market. The Louisville inquiry is expected to bring out keen competition between Northern and Southern iron and will serve as a real test of the Southern market. Most of the iron now sold is resale material and it is being steadily absorbed, though where furnaces are pressing for shipping instructions on suspended shipments, some tonnages are still being offered well below the furnace schedules. From southern Ohio some direct furnace sales have been made at $33, Ironton basis, with resale at $31, furnace base. A sale of 500 tons of foundry iron was made last week to a melter in this district, but the price was not disclosed. A Detroit concern which inquired for 500 tons of malleable is understood to have postponed its purchase. Included in the sales made during the week was one for 150 tons of 50 per cent ferrosilicon. A sale of two cars of Southern foundry at $33, furnace, was made during the week, and it is reported that a furnace in the South has offered a considerable tonnage at $32. While most of the Southern furnaces are quoting $35, it is admitted that on a desirable order this price can be shaded several dollars, and, in the circumstances, a quotation of more than $32 does not appear justified. No transactions are reported in either basic or silveries and prices remain unchanged from last week. Salesmen who covered the territory last week report a dearth of orders, but a more optimistic feeling among foundry men, and, in some cases, an increased melt.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base price)	$36.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	37.75 to 40.75
Ohio silvery 8 per cent sil	47.52 to 51.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	33.52 to 35.52
Basic northern	32.52
Malleable (nominal)	33.52 to 36.02

Warehouse Business.—Local warehouses report that they are receiving just as many orders for steel products as has been the case for many months, but that the tonnages are much smaller, figuring probably 50 per cent of the business booked during normal times. There is some demand for bolts, nuts and rivets, but wire products are very quiet. A better feeling is manifest among jobbers, and while they do not look for business to pick up suddenly, the indications are that before the middle of March a steady flow of good-sized orders will be coming in. Prices remain unchanged.

Iron and steel bars, 3.58c. base; shapes, 3.68c. base; hoops and bands, 3/16 in. and lighter, 4.28c.; plates, 3.88c. base; reinforcing bars, 3.65c.; cold-rolled rounds, 1½ in. and over, 5.20c.; under 1½ in. rounds, flats, squares and hexagons, 5.70c; No. 10 blue annealed sheets, 4.78c. base; 28-gage black sheets, 6c. base; 28-gage galvanized sheets, 7c. base; wire nails, $4 per keg, base.

Finished Material.—Some improvement is noticed in inquiries for finished materials, though orders are mostly for small lots to take care of immediate needs. Sheet mills in this section report a very noticeable improvement over the month of December, and while orders are not very large, they are taken to indicate that stocks in the hands of manufacturers and jobbers are not heavy. Prices on all finished steel are now being quoted at the Industrial Board figures, and while rumors are current that these are being shaded, it is noticeable that orders are being placed at the full schedules. Sheet mill operations are improving since the first of the year. The American Rolling Mill Co. at Middletown is running eight of its 16 mills, and the open hearth furnaces at the East Side plant are all operating, those at the Central Works being down for repairs. The Andrews Steel Co., Newport, Ky., is running 60 per cent of capacity, and the Newport Rolling Mill Co. 50 per cent. The galvanizing plant of the Newport

company will be started this week. Nine of the mills of the Whitaker-Glessner Co. at Portsmouth are ready for operations, following a shutdown for repairs, which included the installation of a new engine. In the structural field, the plans for the Herschede office building in Cincinnati have been posted, and estimates are being made. This will involve 350 tons of structural steel. Bids have also been received for the erection of the steel for the Lunkenheimer plant at Hartwell, and an award will be made this week.

Coke.—The coke market is unchanged. Furnace coke is dead as far as business is concerned, though occasional sales of foundry coke are reported at $7 for Connellsville, $9 for Wise County and $12.50 for New River. A producer of by-product coke has reduced its price for February shipment $1, and is now quoting $8, Connellsville basis.

Old Material.—Only occasional sales are reported in the scrap market. Dealers are buying sparingly for yard stocks. Prices are largely nominal, though relaying rails, on a small transaction, are $5 lower. The Baltimore & Ohio has offered a list of miscellaneous scrap amounting to 12,000 tons.

We quote dealers' buying prices:

	Per Gross Ton	
Bundled sheets	$7.50 to	$8.50
Old iron rails	16.50 to	17.50
Relaying rails, 50 lb. and up	40.50 to	41.50
Rerolling steel rails	12.50 to	13.50
Heavy melting steel	12.50 to	13.50
Steel rails for melting	12.50 to	13.50
Car wheels	19.50 to	20.50
	Per Net Ton	
No. 1 railroad wrought	11.50 to	12.50
Cast borings	6.50 to	7.00
Steel turnings	4.00 to	4.50
Railroad cast	16.50 to	17.50
No. 1 machinery	18.50 to	19.50
Burnt scrap	8.50 to	9.50
Iron axles	23.00 to	23.50
Locomotive tires (smooth inside)	11.00 to	12.00
Pipes and flues	7.50 to	8.00
Malleable cast	10.50 to	11.00
Railroad tank and sheet	6.50 to	7.00

Birmingham

BIRMINGHAM, ALA., Jan. 18.

Pig Iron.—The Birmingham market is still without a real pig iron base. Many small lots for immediate delivery have been booked on the $35 base, the new one established by the Alabama Co. and accepted by other interests making active effort to sell. The larger producers have no determined base and they will not have until large tonnages are sought. The $35 base is as low as can be done in the non-competitive field of the South and for ordinary tonnages. Undoubtedly, concessions would be made for competitive territory and for large tonnages. When lower prices are heard of, it may be presumed, for the time being at least, that they are for attractive business and more than likely in competition with other districts. The extent of the concessions would depend on a variety of items entering into each considered proffer. The general attitude of the Birmingham producers is not to hurry reductions to produce business, but to continue slack production and mark time. The leading interest is known to have quoted $38 this week even when the consumer represented that he could do $5 better. This is taken to mean that the Steel Corporation is no more inclined to beat down prices now than it was to raise them when they tended to soar. Merchant furnace production is confined to five stacks, but the Gulf States Steel Co. remains for the time being on foundry and the Tennessee Coal, Iron & Railroad Co. operates two stacks on foundry on business already booked. The Gulf States Steel Co.'s foundry production is understood to be for sale, but not sold.

We quote per gross ton f.o.b. Birmingham district furnace, the Tennessee company included, as follows:

Foundry, sil. 1.75 to 2.25	$32.00 to $35.00
Basic	34.00
Charcoal	50.00

Finished Material.—The first evidence of a slow down at mills of the Steel Corporation is the stoppage of the structural mill, at Fairfield, Ala., which lacks orders. Other operations, however, continue at normal with large bookings for export and a half dozen ships coming to Mobile for it. Tie, band and hoop mills are still down, although domestic inquiry has picked up somewhat lately. Stocks of all kinds at the finishing mills are small. When resumption of buying occurs, consumers may feel this as a damper on rush shipment. Country merchants have not yet been heard from by wire interests, but farming preparations, now finding first expression, hold forth hope of early inquiry. Independents are operating, when going at all, under 50 per cent.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. has resumed at Birmingham, will resume at Chattanooga during the week and later at Bessemer and Anniston. A half dozen sanitary shops have resumed with employees accepting wage reductions. Some business has come from Florida. Water pipe makers expect considerable business in the early spring from the Carolinas and municipalities of other Southern States.

Coal and Coke.—The Newcastle Coal Co. has closed down its beehive ovens for the time being. Other coke makers have slowed down. Some foundry coke can be gotten as low as $7, but $9 and up are gotten for the higher grades. Coal production is above normal in spite of the strike and piling up of large reserves by industrial companies and the railroads is under way.

Old Material.—The scrap market could not be duller than it is. Even the reduced prices are nominal and very little is leaving the yards.

We quote per gross ton, f.o.b. Birmingham district yards, prices to consumers, as follows:

Old steel rails	$17.00 to $18.00
No. 1 heavy steel	16.00 to 17.00
No. 1 cast	23.00 to 24.00
Car wheels	23.00 to 24.00
Tramcar wheels	22.00 to 23.00
No. 1 wrought	18.00 to 20.00
Stove plate	14.00 to 15.00
Cast iron borings	7.00 to 8.00
Machine shop turnings	7.00 to 8.00

New York

NEW YORK, Jan. 18.

Pig Iron.—Scattering orders are being received from the foundries for small tonnages for prompt shipment and these orders are more numerous than they were a week or two ago, but foundries as a rule are operating at a little less than 50 per cent of capacity. Reports from New England show that foundries in that section are not at all interested in the market, as they are well supplied with iron and are operating at greatly reduced capacity. Of the tonnage recently bought by the leading cast iron pipe company, none was placed through New York agencies. Some figuring is being done as to the possibility of importing pig iron from Belgium. It could probably be laid down in New York at a little less than $30, but if shipment were made any considerable distance, the delivered price would be higher than is now being paid on domestic iron.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$36.52 to $37.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	34.77 to 35.77
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	33.52 to 34.52
Buffalo, sil. 1.75 to 2.25	36.16 to 38.16
No. 2 Virginia, sil. 1.75 to 2.25	40.16 to 42.16

Ferroalloys.—The ferromanganese and spiegeleisen markets are exceedingly quiet. A sale of a small lot of spiegeleisen at from $40 to $45, furnace, is reported for early delivery, but there is no other business pending. A Middle Western consumer has been inquiring for two carloads of ferromanganese on which the usual quotation of $110, base seaboard, was quoted. So far as ascertainable, resale ferromanganese cannot be procured at less than $100, delivered, despite claims to the contrary, although one consumer is understood to be willing to part with some of his supply at around $95,

f.o.b. shipping point. The producers of 50 per cent ferrosilicon are generally asking $95, delivered. Except for the annual inquiry, usually put out at this time by the United States Steel Corporation, involving from 12,000 to 20,000 tons, the market is quite bare of demand. There have been sales of two or there carloads at prices less than $95, but it is stated that these involve quotations dating back some weeks ago. There have also been sales at $95 per ton, delivered.

Warehouse Business.—The market shows little change. Some warehouses continue to report "hand-to-mouth" buying by railroads of small quantities, which normally would be placed with mills. As the cancelled tonnages held by exporters find their way to the market, dealers expect to see slight price fluctuations. While we quote 7c. to 7.35c. per lb. on No. 28 gage galvanized sheets, a few dealers with large stocks are quoting as low as 6.75c. per lb. on fair sized orders, being satisfied with a smaller margin of profit. Refined iron bars have been generally reduced to 3.70c. per lb. and brass is off ½c. per lb. with copper down ¼c. per lb. Dealers in pipe and boiler tubes have reduced quotations on lapwelded and seamless steel boiler tubes about 10 per cent. This was possible through a return by a number of mills to the March 21, 1919, schedule by elimination of premiums. The following prices are now prevailing for delivery out of stock:

Lapwelded steel boiler tubes: 2-in. and 2¼-in., list; 2½-in. to 3¼-in., 3 per cent off list; 3½-in. to 4½-in., 16 per cent off list.

Seamless Steel Boiler Tubes

Price in Cents Per Ft.

1¾-in.	26	3¼-in.	51
2-in.	25	3½-in.	55
2¼-in.	29	3¾-in.	60
2½-in.	36	4-in., No. 10	72
2¾-in.	39	4-in., No. 9	85
3-in.	43		

We quote prices on page 246.

High Speed Steel.—A few inquiries are in the market from machine tool builders and other consumers with the exception of automobile builders. While producers generally are still quoting $1.25 per lb. for 18 per cent tungsten, the price is nominal, fair sized orders bringing out lower quotations. Some producers believe a slight reduction will be made shortly to a more stable price.

Finished Iron and Steel.—An inquiry for 1100 tons of ship plates for April delivery put out by the Texas Co. is of outstanding interest in an otherwise dull steel market. The improvement in demand, which some had looked for to develop about the middle of January, has thus far materialized only in a very small way. There is a better inquiry for small lots and the total of orders for carload or less than carload lots is in greater aggregate. The change for the better is of such slight proportions that it is discernible only to a part of the local trade. To some the situation seems to be unchanged. Jobbers are among those who are sending in orders for small lots, usually a single carload. Their orders are carefully assorted, indicating extreme cautiousness in buying. A feature of the inquiry of the past week is that some companies are estimating on work which will require steel if they obtain the expected contracts. In the structural steel market there are few projects. Elmira, N. Y., is in the market for 200 tons of steel arches for reinforced concrete bridge; the Massachusetts Park Commission is getting bids on 500 tons of steel for a bridge over the Neponsit River, and the Reynolds Building Trust of Boston is asking estimates on a building requiring 300 tons of steel. No new lettings are reported.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.73c.; plates, 3.03c.; shapes, 2.83c.; bar iron, flats, wider than 6 in., 3.88c., with half extras; light rounds, squares and flats, 4.38c., with full extras, and other sizes, 3.38c., with half extras.

Cast Iron Pipe.—Pipe shops are operating at an average of 30 per cent capacity. In the absence of present healthy business manufacturers are speculating as to the time of revival of normal business. This has been placed by those long-experienced at about the first of April. Municipalities are expected to give orders, if for no other reason than to give employment to labor. We quote f.o.b., New York, as follows: 6-in. and larger, $63.30; 4-in., $73.30; 3-in., $83.30, with $4 additional for Class A and gas pipe.

Old Material.—The market is still stagnant and prices have apparently reached bottom, as there is practically no change downward this week. Where dealers must sell, even lower than quoted prices prevail, as instanced by a sale of No. 1 machinery cast for $19, New Jersey shipping point. A slight increase has been made in the price of specification pipe due to demand in eastern Pennsylvania. Brokers say that there are no heavy accumulations of scrap and that when the mills start taking prices will rise.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$10.00 to $10.50
Rerolling rails	13.50 to 14.00
Relaying rails, nominal	48.00 to 50.00
Steel car axles	16.00 to 17.00
Iron car axles	32.00 to 33.00
No. 1 railroad wrought	16.00 to 17.00
Wrought iron track	10.00 to 10.50
Forge fire	9.00 to 9.50
No. 1 yard wrought long	13.00 to 14.00
Light iron	5.00 to 6.00
Cast borings (clean)	9.00 to 10.00
Machine-shop turnings	8.50 to 9.00
Mixed borings and turnings	7.00 to 7.50
Iron and steel pipe (1 in. diam not under 2 ft. long)	10.00 to 11.00
Stove plate	15.00 to 16.00
Locomotive grate bars	13.00 to 14.00
Malleable cast (railroad)	13.00 to 14.00
Old car wheels	22.00 to 23.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton:

No. 1 machinery cast	$22.00 to $24.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	22.00 to 24.00
No. 1 heavy cast, not cupola size	13.00 to 14.00
No. 2 cast (radiators, cast boilers, etc.)	15.00 to 16.00

Boston

BOSTON, Jan. 18.

Pig Iron.—The outstanding feature of the market is its dullness, actual transactions for the past week being confined to even fewer carlots than noted in the previous report. It is intimated, however, that the Crane Co., Bridgeport, Conn., will shortly be in the market for 1000 tons No. 2 plain, and 1000 tons No. 2 X for late February delivery, provided it is obtainable at less than $30, furnace. Sales for the past week have again included special analysis iron, mostly Virginia, including silicon 1.50 to 2 per cent, running high in manganese, at $32 furnace. Virginia resale iron, silicon 2.25 to 2.75, prompt shipment, sold at $34.25, furnace. A small tonnage of regular eastern Pennsylvania No. 2 X furnace iron, prompt shipment, sold at $36.25 furnace, or $35 base. Although foundries in general report no improvement in business, several have received more new orders during the past week than they had before in several months. New business in most instances was booked at price reductions on castings. Some of the New England malleable foundries have cut prices 15 per cent or more, which means 3c. to 4c. per lb. Delivered prices on resale iron follow:

East. Penn., sil. 2.25 to 2.75	$40.31 to $43.31
East. Penn., sil. 1.75 to 2.25	39.06 to 42.06
Buffalo, sil. 2.25 to 2.75	36.71 to 39.71
Buffalo, sil. 1.75 to 2.25	36.46 to 38.46
Virginia, sil. 2.25 to 2.75	39.58 to 41.83
Virginia, sil. 1.75 to 2.25	38.33 to 40.58
Alabama, sil. 2.25 to 2.75	47.91 to 49.91
Alabama, sil. 1.75 to 2.25	46.66 to 48.66

Coke.—No improvement in the demand for coke is noted. Several large consumers are still uncovered on first half requirements. The New England Coal & Coke Co. recently reduced its delivered price on spot foundry from $16.70 to $15.20, or $9 Connellsville oven base, and the Providence Gas Co. from a $10 to a $9 Connellsville oven base, without any noticeable increase in the demand. Connellsville foundry coke is offered here at $6 to $8, or $12.20 to $14.20 delivered, but there have been no takers. Foundries at the moment are not interested in coke at any price.

Finished Material.—The demand for mill shipments of iron and steel products continues of small proportions and spotty. The call for wire nails appears to be better than anything else just now. The 650 tons of structural steel for Lafayette Mills, Pawtucket, R. I., has been held up indefinitely. Levering & Garrigues, New York, are awarded the structural for a 15-story

Hartford, Conn., bank and office building, and the Boston Bridge Works, 166 tons for New Haven Railroad bridge work at Ware Village, Mass. Bids are being asked for approximately 100 tons for an Indian Orchard, Mass., bridge. Local jobbing prices on tees have been reduced $1 to $2 per cwt., those on open hearth and crucible spring steel $2, on steel hoops, iron hoops and steel bands $1, on cold-rolled squares and hexagons 75c., blue annealed sheets 70c., twisted square concrete bars 50c., and on many other kinds of steel from 7c. to 37c.

Jobbers now quote: Soft steel bars, $3.63 per 100 lb. base; flats, $4.50 to $4.85; concrete bars, $3.63 to $3.75; tire steel, $5 to $5.50; spring steel, open hearth, $6.50; crucible, $12; steel bands, $4.58 to $5.25; steel hoops, $5; toe calk steel, $7; cold rolled steel, $5.25 to $6; structural, $3.63 to $4.25; plates, $3.93 to $4.32; No. 10 blue annealed sheets, $5.20; No. 28 black sheets, $6.05; No. 28 galvanized sheets, $7.40; refined iron, $4.65 to $5.65; best refined, $5.50; Wayne, $8.50; band iron, $4.58; hoop iron, $5; Norway, $15.

Old Material.—Machine shop turnings and cast iron borings are lower, approximately $1, but quotations on other old material are unchanged and very largely nominal due to the stagnation of business. The only scrap moving is that offered by manufacturing plants here and there and by railroads, but the latter are not especially anxious to sell on to-day's market basis. Dealers' stocks, generally speaking, were purchased at prices above ruling yard prices, consequently dealings by them are limited. The only sale worthy of note reported this week is a small tonnage of No. 2 cast taken by a Providence melter at 1c. per lb. delivered. The market on No. 1 machinery cast is nominally quoted at around $24, but it is doubtful whether a holder could secure that price if obliged to sell. The most dealers want to pay for stove plate is $15 or $16, but owners generally are holding at $17 to $18 local yard. Prices on old material as quoted at local yards follow:

No. 1 heavy melting steel	$9.00 to $9.50
No. 1 railroad wrought	18.00 to 19.00
No. 1 yard wrought	16.00 to 17.00
Wrought pipe (1-in. in diameter, over 2 ft. long)	9.50 to 10.50
Machine shop turnings	7.50 to 8.00
Cast iron borings, rolling mill	7.50 to 8.00
Cast iron borings, chemical	9.00 to 10.00
Heavy axle turnings	9.00 to 9.50
Blast furnace borings and turnings	6.00 to 6.50
Forged scrap	7.00 to 8.00
Bundled skeleton	7.00 to 8.00
Street car axles, steel	18.00 to 19.00
Car wheels	29.00 to 30.00
Machinery cast	24.00 to 26.00
No. 2 cast	22.00 to 23.00
Stove plate	17.00 to 18.00
Railroad malleable	16.00 to 16.50
Rerolling rails	13.00 to 14.00

St. Louis

ST. LOUIS, Jan. 18.

Pig Iron.—While perhaps 200 to 300 tons of pig iron have been sold during the past week in the St. Louis area the transactions indicated nothing as to demand or price because the purchases were for special needs and for prompt shipment. There have been some small inquiries out during the week, but these were for the most part regarded as feelers to determine the price wanted by the furnaces and if such were the thought behind them they probably failed of their purpose, as no transactions resulted, the inquiries not being for sufficient quantity to really interest the furnaces and cause any active disposition to fill the orders.

Coke.—There was no special activity in coke during the week. The representatives of Connellsville ovens quoted $8 to $8.25 for best selected 72-hr. coke, while New River coke is held at $13, both quotations being on contract coke for the first half of 1921.

Finished Iron and Steel.—Finished products showed no particular life in either the mill or warehouse circles, the trade generally being dull, with the mill representatives still confronted with readjustment features which have prevailed during the past several weeks. For stock out of warehouse we quote as follows:

Soft steel bars, 3.57½c.; iron bars, 3.57½c.; structural material, 3.67½c.; tank plates, 3.87½c.; No. 10 blue annealed sheets, 4.77½c.; No. 28 black sheets, cold-rolled, one pass, 6.10c.; No. 28 galvanized sheets, black sheet gage, 7.45c.

Old Material.—Trading in the scrap market the past week has been confined to transactions among dealers. The mills and other consumers are not purchasers with the exception of the Scullin Steel Co., which bought about 2000 tons of heavy melting railroad steel scrap against possible casting contracts. No railroad lists came out during the week and prices generally remained as last quoted except that No. 1 railroad heavy melting steel and frogs, switches and guards cut apart are now held at about $15 to $15.50.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district, as follows:

Per Gross Ton	
Old iron rails	$20.50 to $21.00
Old steel rails, rerolling	17.00 to 17.50
Old steel rails, less than 3 ft.	15.00 to 15.50
Relaying rails, standard section, subject to inspection	35.00 to 40.00
Old car wheels	21.00 to 21.50
No. 1 railroad heavy melting steel	15.00 to 15.50
Heavy shoveling steel	13.00 to 13.50
Ordinary shoveling steel	12.50 to 13.00
Frogs, switches and guards cut apart	15.00 to 15.50
Per Net Ton	
Ordinary bundled sheet	6.00 to 6.50
Heavy axle and tire turnings	7.00 to 7.50
Iron angle bars	22.00 to 22.50
Steel angle bars	13.00 to 13.50
Iron car axles	29.00 to 29.50
Steel car axles	18.00 to 18.50
Wrought arch bars and transoms	20.00 to 20.50
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	13.00 to 13.50
Railroad springs	12.50 to 13.00
Steel couplers and knuckles	12.50 to 13.00
Locomotive tires, 42 inches and over, smooth inside	10.00 to 10.50
No. 1 dealers' forge	9.00 to 9.50
Cast iron borings	7.50 to 8.00
No. 1 busheling	13.00 to 13.50
No. 1 boilers, cut to sheets and rings	8.00 to 8.50
No. 1 railroad cast scrap	17.00 to 17.50
Stove plate and light cast scrap	14.00 to 14.50
Railroad malleable	12.00 to 12.50
Agricultural malleable	12.00 to 12.50
Pipes and flues	10.50 to 11.00
Railroad sheet and tank scrap	8.00 to 8.50
Railroad grate bars	12.00 to 12.50
Machine shop turnings	5.00 to 5.50
Country mixed scrap	9.00 to 9.50
Uncut railroad mixed scrap	9.50 to 10.00
Horseshoes	16.50 to 17.00
Railroad brake shoes	12.00 to 12.50

Buffalo

BUFFALO, Jan. 18.

Pig Iron.—There seems to be a little better feeling in the market this week and one producer has sold more iron than any week in the past 10 weeks. This producer sold approximately 4000 tons of foundry of all grades of silicon. The price paid was from $30 to $32 for the base grade, it is believed. There are rumors of even lower price for the low grade of foundry, but these reports have not been verified. Inquiry is picking up somewhat and lots from a carload to 1000 tons are being inquired for. Two furnaces are adhering to a $35 schedule as far as possible for the base foundry grade, but as might be expected are doing little or no business when the same quality of iron can be had for considerably less. Consumption of iron on contracts is improving. There is some inquiry for malleable, but a quotation of $35.25 did not get the business on a recent request for prices.

We quote f.o.b. Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$33.00 to $37.00
No. 2X foundry, 2.25 to 2.75 sil.	31.25 to 35.25
No. 2 plain, 1.75 to 2.25 sil.	30.00 to 34.00
Basic	35.00
Malleable	36.25

Finished Iron and Steel.—A slight improvement in the market is noticeable. This is not to be construed into the awaited rejuvenation of business, but a somewhat better feeling is evident. This shows itself in increased inquiries. There is a better volume of inquiry, though the tonnage wanted is small. This applies especially to shapes and bars, and in a lesser way to tubular products. Indications are that there has been a little over-liquidation in the past 60 days and some consumers are really pressed for material. Business is coming in at about 20 per cent of normal, according to some sales agencies. It has never ebbed so low before. Although sellers do not think 1921 will be a big year, they believe the worst has been passed, and that some time presently the demand for all products should begin to grow and grow steadily. A local mill interest started a sheet bar mill Saturday. This plant's No. 2 mill, which has been rolling on and off during the past month, will start shortly on angles.

A structural mill and a plate mill are due to be started by this interest early in February. Another plant proposes to start a 10-in. stock billet mill in February. A sales agency handling tubular products reports its mill running on a large backlog. Concrete bar interests report little or no interest.

We quote prices f.o.b. Buffalo as follows: Structural shapes, 3.60c.; plates, 3.80c.; plates, No. 8 gage, 4.85c.; soft steel bars and shapes, 3.50c.; hoops, 4.60c.; blue annealed sheets, No. 10 gage, 4.90c.; galvanized steel sheets, No. 28 gage, 7.35c.; black sheets, No. 28 gage, 6c.

Old Material.—Railroad lists that closed within the past 10 days brought $16.50 for the heavy melting steel contained. These are the first sales of consequence in weeks, and establish a market price for this grade. One mill is displaying some interest and is offering dealers $15 for heavy melting steel, and making some small purchases at this figure. In the main, dealers prefer to retain what tonnage they have in preference to selling at this price, as a rise in price is being generally awaited. The mill, which is in the market for material, is also allowing shipments to be made on old orders, taken at high prices. These shipments were suspended three months ago. There seems to be a better feeling throughout the entire market.

We quote dealers' asking prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$15.50 to $16.50
Hydraulic compressed	13.00 to 14.00
Low phos., 0.04 and under	22.00 to 23.00
No. 1 railroad wrought	20.00 to 21.00
No. 1 machinery cast	20.00 to 21.00
Iron and steel axles	30.00
Car wheels	20.00 to 21.00
Railroad malleable	16.00 to 17.00
Machine shop turnings	11.00 to 12.00
Heavy axle turnings	14.50 to 15.50
Clean cast borings	11.00 to 12.00
Iron rails	23.00 to 24.00
Locomotive grate bars	15.00 to 16.00
Stove plate	17.00 to 18.00
Wrought pipe	14.00 to 15.00
No. 1 busheling	13.00 to 14.00
Bundled sheet stampings	10.00 to 11.00

Cleveland

CLEVELAND, Jan. 18.

Iron Ore.—The all-rail shipments of iron ore from the Lake Superior district during 1920 amounted to 1,710,122 gross tons. Final checking may result in a slight change in this figure, but it is approximately correct. This makes the total shipments for the season, including lake and all rail, 60,237,348 tons. Developments in regard to ore carrying charges are recorded elsewhere in this issue.

We quote delivered lower lake ports: Old range Bessemer, $7.45; old range non-Bessemer, $6.70; Mesaba Bessemer, $7.20; Mesaba non-Bessemer, $6.55.

Pig Iron.—With an absence of demand pig iron prices continue to show a downward tendency. Following a 500-ton lot sale of foundry iron by Valley furnaces at $32.75, lake furnaces have marked their price on this grade down to $33. One Valley furnace is now offering foundry iron at $32. Another names $32.75 as a nominal quotation. Resale foundry iron is still to be had at $30 to $31, although a 100-ton lot sale is reported at $32, being made direct by a foundry. Two round lot inquiries for foundry iron have developed, one from the American Radiator Co. for 1000 tons for its Titusville, Pa., plant for prompt shipment, and the other for the Standard Sanitary Mfg. Co. for 3000 tons for its Louisville, Ky., plant for January and February shipment. The latter inquiry is either for Northern or Southern iron, one-half each of 1.75 to 2.25 and 2.25 to 2.75 silicon. The pig iron situation has grown worse in that furnaces have fewer shipping orders and January shipments will fall considerably below those of December. Practically no releases are coming out on suspended shipments. The Struthers Furnace Co. will blow out its stack at Struthers, Ohio, Jan. 21, and the Otis Steel Co. expects to put both its Cleveland furnaces out of blast before the end of the month. In order to write down their inventories for tax purposes, many foundries have made new contracts for delivery during the first half of this year on iron carried over from 1920. These contracts are based on about present market prices, the buyer paying in cash the difference between the old and new contract prices. The weakness that has developed in low phosphorus iron in the East has affected this grade in this market, a Valley producer having marked down its price $1 a ton.

We quote delivered Cleveland as follows, based on the new freight rates, these being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$34.96
Northern No. 2 fdy., sil. 1.75 to 2.25	$31.96 to 33.56
Southern fdy., sil. 2.25 to 2.75	39.92 to 42.67
Ohio silvery, sil. 8 per cent	51.86
Standard low phos., Valley furnace	44.00

Semi-finished Steel.—The market on sheet bars and slabs is very irregular. Small lot inquiries on slabs have brought out a wide range of quotations from $46 down to $40 per ton, or possibly lower.

Finished Iron and Steel.—The demand for finished steel shows a little improvement. This is evidenced by an increase in the number of inquiries and orders for small lots. Plates and structural material are more active than steel bars, although some demand has sprung up for the latter for reinforcing work. The only change in mill operations in this territory is the starting up of the Upson plant of the Bourne-Fuller Co., which is operating two of its open-hearth furnaces, but this plant will probably again suspend operations at the end of the week. A Cleveland manufacturer has released shipments on 1300 tons of light rails held up several months ago, and there have been a few other releases of suspended shipments, but only in small lots. No releases or new orders are as yet coming from the automobile field. A report from Detroit states that the Ford Motor Co. will resume operations Feb. 17 or sooner. Reports of the shading of the Industrial Board price on plates have been confirmed. A 2.50c. price has been named in some cases, but that appears to be the lowest quotation of which there is any confirmation, and this price does not seem to be as general as rumors might indicate. The Louisville & Nashville Railroad is placing orders for plates and other steel for 34 locomotives to be built in its own shops. While considerable work is developing in the building field, no inquiry for steel for construction work came out during the week.

Cleveland warehouses quote steel bars at 3.30c. to 3.34c.; plates, 3.60c. to 3.64c. and structural material, 3.40c. to 3.44c.; No. 9 galvanized wire, 4.70c.; No. 9 annealed wire, 4c.; No. 28 black sheets, 5.60c.; No. 28 galvanized, 6.95c.; No. 10 blue annealed, 4.55c.

Coke.—The coke market continues inactive. Prompt shipment foundry coke is generally quoted at $7 for standard Connellsville makes, but there is no call for it. One large Ohio foundry is inquiring for coke for its first half requirements.

Bolts, Nuts and Rivets.—Rivet prices have again declined $5 a ton, this being the third $5 reduction since about Dec. 1. The new prices are 4c. per lb., Pittsburgh, for structural and 4.10c. for boiler rivets. No change has been made in small rivets which recently have been quoted at 60 per cent off list. The bolt and nut market is inactive and makers feel that a round lot inquiry would probably bring out lower prices than the prevailing quotations. There have been some recent suspensions of export orders and shipments on most of these orders are now entirely shut off. Consequently, the situation has grown worse.

Sheets.—Sheet prices are being shaded $1 to $2 per ton by some of the independent mills, but others are adhering to regular prices. In some cases, mills are making quotations f.o.b. mill instead of Pittsburgh. Indications are that shading might become more general should any large inquiries come out. Warehouses have reduced sheet prices, basing their new prices on a $15 a ton differential above mill prices on blue annealed sheets and a $20 a ton differential on black and galvanized sheets, plus freight. The demand shows a little improvement, but consumers are buying only in small lots.

Old Material.—No improvement has developed in the scrap market and prices remain at about recent levels. One local mill is taking shipments of heavy melting steel and is offering $14 for this grade. Dealers are offering the same price to fill orders with this consumer. Another local consumer is still taking borings and turnings for its blast furnaces, but with this exception no scrap is being accepted by consumers. Considerable

railroad scrap is coming on the market. Dealers are buying this to fill outstanding orders, hoping that mills will accept shipments on their orders when the railroads make deliveries. Otherwise the dealers will lay the material down in their yards.

Dealers quote delivered at consumers' yards in Cleveland and vicinity as follows:

	Per Gross Ton	
Heavy melting steel	$14.00 to	$14.25
Steel rails, under 3 ft	17.00 to	17.50
Steel rails, rerolling	17.00 to	18.00
Iron rails	17.00 to	17.50
Iron car axles	33.00 to	35.00
Low phos. melting scrap	16.50 to	17.00
Cast borings	11.50 to	12.50
Machine shop turnings	9.00 to	9.50
Mixed borings and short turnings	10.00 to	12.00
Short turnings for blast furnaces	10.00 to	12.00
Compressed steel	9.75 to	10.25
Railroad wrought	15.50 to	16.00
Railroad malleable	17.50 to	18.00
Steel axle turnings	11.75 to	12.50
Light bundled sheet stampings	6.00 to	7.00
Drop forge flashings over 10 in.	9.00 to	10.00
Drop forge flashings under 10 in.	9.00 to	10.00
No. 1 cast	21.00 to	22.50
No. 1 busheling	10.00 to	10.50
Railroad grate bars	15.50 to	16.00
Stove plate	15.50 to	16.00
Cast iron car wheels	20.00 to	21.00
Pipes and flues	9.00 to	10.00

Philadelphia

PHILADELPHIA, Jan. 18.

There have been several slight indications during the past week that an improved demand for pig iron, steel and other products is in sight. While no business of importance was placed, there was an aggregate of small orders that was encouraging in comparison with the almost total absence of orders in preceding weeks. One independent steel company, which booked practically no business in the week before last, received orders last week aggregating a few thousand tons. Most of these were of single carload size, but there was one order for 500 tons of bars. An Eastern sheet mill has received a sufficient number of small orders to make possible the resumption of rolling on Feb. 1. Another sign of improvement is in the demand for small lots of steel from warehouses. One large local jobber reports a steady increase in its business since the first of the year, each week having produced more orders than the week preceding. Some of the orders which Eastern steel companies are receiving come from jobbers. An increase in the number of inquiries for pig iron is also in evidence, though the market as a whole is still very dull.

Pig Iron.—While there is a slight increase in the number of inquiries, no important business in pig iron has developed. The market is dull with prices soft. Occasional lots of resale iron come into the market at prices somewhat below those which the furnaces are quoting. Foundry iron is now available on the basis of $31 to $33, furnace, this being for No. 2 plain, with the addition of $1 or $1.25 for No. 2X. Basic iron has been quoted at $28, delivered, but no business has resulted. A few hundred tons of standard low phosphorus iron was sold last week at $42, furnace. Copper bearing low phosphorus iron is quoted at $40, furnace. Only two Virginia furnaces are now in blast and these quoted No. 2 plain iron at $38, furnace. Resale Virginia iron is offered at least $5 below this price. That stocks of iron in the hands of foundrymen are being depleted is indicated by the reinstatement of some suspended orders. Shipments are again being made on these orders, which were held up two months or so ago. Some of the furnaces have encouraged melters to reinstate their orders by voluntarily revising prices downward.

The following quotations are for iron delivered in consumers' yards in Philadelphia or vicinity, except those for low phosphorus iron, which are f.o.b. furnace:

East. Pa. No. 2 plain, 1.75 to 2.25	$32.00 to	$34.15
East. Pa. No. 2X, 2.25 to 2.75 sil.	33.25 to	35.40
Virginia No. 2 plain, 1.75 to 2.25 sil.	38.74 to	40.74
Virginia No. 2X, 2.25 to 2.75 sil.	39.99 to	41.99
Basic deliv. Eastern Pa.		33.86
Gray forge	31.40 to	33.40
Standard low phos. (f.o.b. furnace)		42.00
Malleable (nominal)		37.00
Copper bearing low phos. (f.o.b. furnace)		40.00

Ferroalloys.—A few inquiries for carload lots of ferromanganese have come out in the past week. Domestic makers are again quoting on a delivered basis, the price being $110, freight allowed. This is below the British quotation, which is $110, Atlantic seaboard. Several carloads of resale ferromanganese have been sold at $93 to $95, delivered. Spiegeleisen is dull.

Semi-Finished Steel.—It is reported that rerolling slabs have been offered at a liberal concession in price, but no business has resulted. The market is dull.

Plates.—There is no decided improvement in the demand for plates, but occasional small lot orders are now being received. One Eastern mill is operating spasmodically, but the others continue shut down. Apparently Eastern mills are quoting 2.65c., Pittsburgh, on plate inquiries, but reports continue that this price has been shaded by some mills.

Structural Material.—One independent company reports a fair increase in the number of orders for shapes within the past week. Most of the orders were for carload lots, but the aggregate was larger than any single week's business in some time. The League Island Navy Yard is in the market for 3000 tons of boat shapes. Plain material continues to be quoted at 2.45c., Pittsburgh.

Warehouse Business.—Some improvement in warehouse business is noted. One local jobber reports that the aggregate of orders each week of the new year has been larger than the preceding week. We quote local prices as follows:

Soft steel bars and small shapes, 3.70c.; iron bars (except bands), 4c.; round edge iron, 4.10c.; round edge steel, iron finish, 1½ in. x ½ in., 4.00c.; round edge steel, planished, 4.75c.; tank steel plates, ¼-in. and heavier, 4.00c.; tank steel plates, 3/16-in., 4.40c.; blue annealed steel sheets, No. 10 gage, 4.90c.; light black steel sheets, No. 28 gage, 5.95c.; galvanized sheets, No. 28 gage, 7.50c.; square twisted and deformed steel bars, 3.90c.; structural shapes, 3.80c.; diamond pattern plates, 6.00c.; spring steel, 6.50c.; round cold-rolled steel, 5.35c.; squares and hexagons, cold-rolled steel, 5.85c.; steel hoops, No. 13 gage and lighter, 4.65c.; steel bands, No. 12 gage to 3/16-in. inclusive, 4.65c.; iron bands, 5c.; rails, 3.70c.; tool steel, 16.00c.; Norway iron, 12.00c.; toe steel, 6.00c.

Bars.—One company has booked an order for 500 tons of bars from an Eastern shipyard. Other bar orders, mostly carload lots, have been booked in the past week. While the demand is still extremely light, there was an improvement during the past week as compared with preceding weeks. All of this business was taken at 2.35c., Pittsburgh. The Eastern bar iron mill which reduced its price to 2.35c., Pittsburgh, has booked a fair number of small orders at this price. With one or two exceptions other bar iron mills have not made the reduction.

Sheets.—While business is not active, an Eastern company has taken a number of orders for blue annealed sheets and will be able to put some of its mills in operation about Feb. 1. There are reports of price shading.

Old Material.—On small sales, cast scrap has advanced $2 a ton. An Eastern consumer is offering $16, delivered, for wrought pipe, this being $2 a ton above the price quoted in this report last week. Otherwise the scrap market continues dull. We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$14.50 to	$15.00
Steel rails, rerolling	18.00 to	19.00
No. 1 low phos., heavy 0.04 and under	23.50 to	24.00
Car wheels	25.00 to	26.00
No. 1 railroad wrought	20.00 to	21.00
No. 1 yard wrought	16.00 to	18.00
No. 1 forge fire	13.00 to	13.50
Bundled skeleton	13.00 to	13.50
No. 1 busheling	15.00 to	16.00
No. 2 busheling	11.00 to	12.00
Turnings (short shoveling grade for blast furnace use)	13.00 to	13.50
Mixed borings and turnings (for blast furnace use)	12.00 to	12.50
Machine-shop turnings (for rolling mill and steel works use)	13.00 to	13.50
Heaxy axle turnings (or equivalent)	14.50 to	15.00
Cast borings (for rolling mills)	15.00 to	16.00
Cast borings (for chemical plants)	17.50 to	18.00
No 1 cast	24.50 to	25.50
Railroad grate bars	17.00 to	18.00
Stove plate (for steel plant use)	17.00 to	18.00
Railroad malleable	16.00 to	17.00
Wrought iron and soft steel pipes and tubes (new specifications)	16.00 to	16.50
Iron car axles	30.00 to	31.00
Steel car axles	25.00 to	26.00

British Iron and Steel Market

More Plants Closing—Prices Are Easier—Coal Supplies Exceeding Demand

LONDON, ENGLAND, Jan. 7.

(*By Cable*)

Additional iron and steel works all over the country are preparing to close or curtail operations further. Prices are easier. Lancashire steel bars are quoted at £21 f.o.b. for export and £22, delivered Midlands, while Staffordshire unmarked bars are quoted at £28 10s. Belgian ship plates have sold at £18 f.o.b. and Belgian billets are offered at £10 10s., delivered Midlands. The Baldwins-Mannesmann fusion has been arranged.

Tin plate prices are steady but there is no large business moving. The proposal to set up a Welsh selling agency with a capital of £1,250,000 is to be called the Welsh Tin Plate Firms, Ltd., the main apparent object being to eliminate merchants. A further meeting is to be held this week. The galvanized sheet market is weak.

Scotch coal masters are discarding fixed prices for export owing to the supply exceeding the demand. Midland coke has been reduced 10s. 9d. to 55s. and pig iron has been reduced 15 to 25s. Derbyshire No. 3 is now £11 15s. on rail, with gray forge £11 5s. and Northants forge £11. Cleveland pig iron prices are unchanged but further cuts are expected because consumers are showing little disposition to purchase. Foreign iron ore is stagnant with sellers offering Bilbao rubio at 45s., ex-ship, Tees.

We quote per gross ton except where otherwise stated, f.ob. maker's works, with American equivalent figured at $3.76 for £1, as follows:

Midland coke	£2 15	$10.34	
Cleveland basic	11 0	41.36	
Cleveland No. 1 foundry	11 5 to £12 5	42.30 to	$46.06
Cleveland No. 4 forge	10 12½ to 10 17½	39.95 to	40.89
East Coast mixed	12 0 to 12 5	45.12 to	46.06
Ferromanganese	32 0 to 33 0	120.32 to	124.08
Ship plates	24 10 to 28 0	92.12 to	105.28
Boiler plates	31 0 to 33 0	116.56 to	124.08
Tees	23 0 to 25 0	86.48 to	94.00
Channels	22 5 to 24 5	83.66 to	91.18
Beams	22 0 to 24 0	82.72 to	90.24
Round bars, ¾ to 3 in.	23 0 to 25 0	86.48 to	94.00
Rails, 60 lb. and up	25 0 to 27 0	94.00 to	101.52
Billets	15 10 to 16 10	58.28 to	62.04
Sheet and tin plate bars, Welsh	16 0 to 17 10	60.16 to	65.80
Galvanized sheets, 24 g.	28 0	105.28	
Tin plate base box	1 14	6.39	
Steel hoops	27 0	101.52	

Canadian Pig Iron Market

TORONTO, Jan. 17.—The Canadian pig iron market has been gradually developing weakness during the past month or two and despite the fact that producers opened their books for first half 1921 business some time ago, few consumers have taken advantage of this to place orders for their requirements during the period. Within the past couple of months pig iron prices have been showing a softening tendency and have been gradually reduced from the high level of $59.14 per ton for No. 1 and malleable to the prevailing price of $43.64, Toronto. Montreal prices are approximately $2 per ton higher on account of additional freight charges. Although prices have come down $16.50 a ton within the past two months, the demand does not appear to have been strengthened, but spot iron is moving in a brisk manner. Furnaces at Port Colborne, Hamilton, Midland and Sault Ste. Marie, Ont., are blowing and most have enough business on their books to keep them going for a couple of months longer, and it is expected that by the end of this time business will again be moving in a normal way.

William N. John has been elected president of the John Chuck Co., Milwaukee, a new corporation formed to manufacture chucks and other tool specialties. Other officers are: Vice-president and sales manager, A. W. Bues; secretary and treasurer, David F. Armitage; directors, Frank Armitage and E. C. Pfeffer.

DECLINING BELGIAN PRICES

Light Business and Shifting Employment—Higher Coal Prices Expected

BRUSSELS, BELGIUM, Dec. 29.—During the end of 1920 British and other buyers in Belgium have been engaged in stock inventories and buying has been exceedingly light. Generally the business situation has not yet recovered from the dullness of the holiday period and buyers still show no inclination to change their tactics of refusing to place orders until lower prices are quoted. The only regular foreign purchasing is from Spain and Far Eastern markets, and although these purchases are not large, they are given careful consideration by mills as orders are almost always repeated at regular intervals.

Prices still show a slight tendency to decrease. Pig iron has approached 350 francs ($23.45) per metric ton of 2200 lb., and steel bars are not far from 66 francs per 100 kg. (2c. per lb.). Sheets also have fallen off and prices on plates are now in the neighborhood of 88 to 90 francs per 100 kg. for ¼-in. (2.65c. to 2.70c. per lb.). Two Belgian mills are conducting experiments toward the successful production of magnetic sheets and other sheets of fine gage for use in the manufacture of dynamos. Semi-finished material is being offered at low prices with few takers.

Belgian mining interests complain that they are carrying more than their share of the present price reductions and are looking forward to an increase in coal about March or April, and in some quarters the increase is expected even sooner.

Employment Conditions

Because of present conditions about 70 per cent of the metal working plants and machinery manufacturers are curtailing production. Employment agencies report having placed more than 8000 workers in positions during October, 1920, against about 11,000 applications for employment. From Oct. 1 to 6 about 400 skilled workmen were sent into France to positions. A number of blast furnaces have been blown out and several rolling mills have practically closed down. The labor situation is much improved from the standpoint of the employer, the workers realizing that revision of wages upward is no longer possible under present conditions.

Some small specifications are in the market from Central American republics for light rails and iron bars. Mexico is beginning to be regarded with favor by exporters, who see prospects of good business, provided the people continue to inspire confidence by working. Several thousand tons of tramway rails are in the market. The Belgian railroad administration has reopened negotiations with the car builders, which may result in the awarding of large contracts.

Albert Kingsbury, Philadelphia, will henceforth conduct his business, of designing, manufacturing and selling of Kingsbury thrust bearings, under the name of Kingsbury Machine Works. The new office and factory are located on Tackawanna Street, near Church, Street, Philadelphia.

E. I. duPont deNemours & Co., Wilmington, Del., have issued an announcement to employees that effective Feb. 1 all extra compensation allowed salaried employees since Oct. 1, 1919, will be discontinued. About 6000 persons are affected. Workmen and laborers at the different plants do not come under the ruling.

The Cleveland Crane & Engineering Co., Wickliffe, Ohio, has increased its authorized capital stock from $200,000 to $1,000,000 in order to give its employees an opportunity to become stockholders in the company. It has not yet been decided how much of the additional stock will be issued.

Approximately 250 foremen and business executives from 40 Hartford plants attended the monthly meeting of the City Foremen's Get-Together Club, in that city, Jan. 13. B. H. Blood, Pratt & Whitney Co., presided. Harry N. Clarke, Corte-Scope Co., Cleveland, spoke on the Law of Thrift.

ORE CARRYING ADVANCE

Railroads Propose to Ask Revision Upward—Lower Ore Prices Are Expected

CLEVELAND, Jan. 18.—The four railroads carrying ore from the old ranges to upper lake ports are preparing to ask for an increase in carrying charges amounting to 10c. and 15c. a ton, doing this in the face of a complaint recently filed with the Interstate Commerce Commission by 87 of the ore mining companies asking for a reduction in the present ore-carrying rates from the mines to the docks, which they claim are excessive. The railroads are seeking an advance of 10c. per ton on the line haul to Ashland and Escanaba, and a 5c. increase in the dock charge, which would make the ore carrying rate to these ports $1 a ton, or the same as for the much longer hauls from the Mesabi range. For shipments to Marquette they want an advance of 5c. on the line haul and 5c. on the dock charge, making the rates to that port 75c. and 85c. as compared with the present rates of 65c. and 75c. The present rates for carrying ore from the mines to the railroads were established in 1918 when a sharp advance was made by the Government to help out the railroads in a war time emergency, and consequently when the advance in freight rates was made last July the ore haul from the mines to the upper lake ports was exempted from the flat rate advance. At least one ore carrying road has prepared its new tariff calling for the advance which is to be filed with the Interstate Commerce Commission under date of Jan. 25. The advances under this tariff will go into effect 30 days later unless mining companies make successful protest against the rate advance. It is certain that such a protest will be made by the ore companies to the Interstate Commerce Commission unless the railroads finally decide not to file the new tariffs. Some of the officials of the interested railroads were in conference with ore firms in Cleveland last week in regard to the advance, evidently having come to sound out the feeling of the ore men respecting the proposed increase, and found out that the mining companies are strongly opposed to any advance in the ore carrying rate.

Valuation for Inventory

Furnace companies are giving considerable attention to valuations to be placed on iron ore for inventory purposes in preparing their tax returns. Many consumers have asked ore firms for advice on how much they should write down their ore in their inventories, but the usual reply has been that the present owners of the ore must use their own judgment. Some furnaces are marking ore down 50c., some $1, and some $1.50 per ton, and others are making no reduction from the cost price in inventories. Under the Government ruling, a furnace must inventory its ore at cost or present market value. Steel companies owning, or interested in, mines, consequently can inventory their ore at actual cost, but merchant furnaces must use as their inventory basis the price they paid, or the present market value. As there will be no new market price until ore prices for the season are established, which may not be until well along into the spring, the present market value of ore can only be guessed.

While lower ore prices for the coming season are looked for, there has so far been no reduction in the cost of mining except in reducing wages in a very few of the mines, and lake transportation rates have not been fixed for the coming season, so that there is no basis on which to fix present ore values in inventories.

Pittsburgh Iron and Steel Market

(*Continued from page* 221)

either spot or contract tonnages, and claim to have taken some business at this figure. The spot market on foundry coke is quoted from $6.50 to $7 generally, though some producers are holding for more. Practically no contracting is going on in either grade at present. Furnace interests are supplying from yard stocks such demand for pig iron as is coming out and are not in a hurry to turn the blast on in idle furnaces. Moreover they regard the possibility of lower prices as better than an advance, and seem content to supply their needs from spot offerings. Contract foundry coke is quoted anywhere from $7.50 to $10, but it is understood that companies quoting the higher figure are not insisting on this price against orders on their books. Some are changing six months' contracts into monthly agreements and are billing January shipments at $8.25.

Old Material.—Possibly there is a little more interest in the market on the part of the steel manufacturers, but so far this has not resulted in the placing of much business. The reason is to be found in the fact that the bids have been much below what the dealers could meet and yet make a profit. Although real consumptive buying is lacking, there is a slightly stronger undertone to the market, due to the fact that dealers are experiencing considerable difficulty in picking up tonnages at what might be considered low prices. Because of that fact, they are not very anxious for business. It is reported that a dealer recently paid in excess of $17 for the heavy melting steel offered by the Pennsylvania Railroad, Eastern section. This would warrant some revision upward in heavy melting grades, especially as dealers lately have not been able to buy this grade as low as $15. The railroads are not offering scrap very freely at present for the reason that labor still is pretty costly and the collection of the material hardly is warranted at the prices which now can be obtained. The Baltimore & Ohio Railroad is asking bids on approximately 12,500 gross tons, the list closing at noon, Jan. 24. The largest items in this list are 2000 tons of No. 1 steel rails, 1700 tons of No. 2 wrought, and 1300 tons of destroyed steel cars.

We quote for delivery to dealers' yards in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$16.00 to $17.00
No. 1 cast, cupola size	25.00 to 26.00
Rerolling rails, Newark and Cambridge, O.; Cumberland, Md.; Parkersburg and Huntington, W. Va.; Franklin, Pa., and Pittsburgh	17.00 to 18.00
Compressed sheet steel	13.00 to 14.00
Bundled sheet sides and ends, f.o.b. consumers' mills Pittsburgh district	11.00 to 12.00
Railroad knuckles and couplers	16.50 to 17.50
Railroad coil and leaf springs	16.50 to 17.50
Railroad grate bars	17.00 to 18.00
Low phosphorus melting stock, bloom and billet ends, heavy plates ¼-in. and heavier	24.00 to 25.00
Railroad malleable	16.00 to 17.00
Iron car axles	36.00 to 37.00
Locomotive axles, steel	32.00 to 33.00
Steel car axles	22.00 to 23.00
Cast iron wheels	22.00 to 23.00
Rolled steel wheels	16.50 to 17.50
Machine shop turnings	10.00 to 10.50
Sheet bar crop ends at origin	16.00 to 17.00
Heavy steel axle turnings	14.00 to 15.00
Short shoveling turnings	13.00 to 14.00
Heavy breakable cast	19.00 to 20.00
Stove plate	17.00 to 18.00
Cast iron borings	13.00 to 14.00
No. 1 railroad wrought	16.00 to 17.00

It is reported from Cass County, Texas, that iron ore beds located there have been sold by D. M. Barringer, Real Estate Trust Building, Philadelphia, to Pratt Brothers, Minneapolis, Minn. A plant for crushing, washing and drying the ore will be built.

Frank Samuel, Harrison Building, Philadelphia, has been appointed American agent for the Newcastle Alloy Co., Ltd., Newcastle-upon-Tyne, England, manufacturer of ferrotungsten, ferromolybdenum and ferrochrome.

IRON AND INDUSTRIAL STOCKS

Trading in Them Is Less Active and Market Values Irregular

Following the drastic liquidation in the latter part of 1920 and the subsequent partial recovery in the early part of this month, the market for iron and industrial stocks has been less active and irregular, the natural result of excessive price movements. In the meantime, money rates are working easier; the foreign exchange market reflects a heavy shifting in our foreign credits; and the readjustment in certain industries and of labor nears completion; all constructive features. The stock market really is passing through a digestive period, which in a large measure accounts for its comparative quietness and irregularity.

Certain groups of stocks, however, continue to reflect developments in their respective fields, although to a lesser degree than was the case from Jan. 3 to Jan. 10. Generally better prices for railroad issues are based to some extent on expected Government compensation. The downward trend of automobile stocks suggests that the near future of the industry is by no means assured and made somewhat worse by the closing of the Ford plant and by the intention of W. C. Durant to re-enter the field. Telephone, woolen, leather, shoe and paper securities are firmer, possibly because readjustments are passed; prices for copper stocks suggest no immediate improvement in the market value of the red metal; while the action of the steel shares indicates confidence in the future of that industry.

The range of prices on active iron and industrial stocks from Saturday of last week to Monday of this week was as follows:

Allis-Chal. com..	33¼- 35½	Lack. Steel	53⅛- 58½
Allis-Chal. pf....	77 - 79¼	Lake Sup. Corp.	8¾- 9⅞
Am. Can com...	26½- 29¼	Midvale Steel ..	31¼- 33⅛
Am. Can pf.....	83¾- 85¾	Nat.-Acme	24 - 27
Am. C. & F. com.	122 -127¼	Nat. E. & S. com.	51⅛- 54
Am. C. & F. pf.. ..	-112	N. Y. Air Brake	79½- 84⅛
Am. Loco. com..	83 - 86¼	Nova Scotia Steel	34½- 35½
Am. Loco. pf....	102 -102½	Pressed Stl. com.	84 - 88
Am. Rad. com..	68⅞- 70⅞	Ry. Stl. Spg. com.	83 - 86¼
Am. Stl. F. com.	30⅝- 31½	Ry. Stl. Spg. pf.	105½-106
Am. Stl. F. pf..	85 - 85¾	Replogle Steel ..	34¾- 39½
Bald. Loco. com.	87⅛- 94¼	Republic com. ..	63 - 71½
Bald. Loco. pf...	99⅞-100	Republic pf.	92¼- 94
Beth. Steel com..	54½- 59¼	Sloss com.	52 - 56
Beth. Stl. Cl. B.	56¼- 60⅞	Superior Steel ..	46 - 48
Beth. Stl. 8% pf.	103 -107½	Sup. Stl. 1st pf.. ..	- 97½
Chic. Pneu. Tool.	68 - 70¼	Trans.-Williams..	42¼- 43
Colo. Fuel	29 - 30½	Un. Alloy Steel.	31½- 32
Cruc. Steel com..	85¼-107½	U. S. Pipe com..	12½- 13
Cruc. Steel pf...	90 - 99	U. S. Pipe pf.... ..	- 42½
Gen. Electric ...	120½-123½	U. S. Steel com..	82⅛- 84¾
Gt. N. Ore cert..	29¼- 30	U. S. Steel pf...	108⅞-110
Gulf States Steel	32¼- 34¾	Vanadium Steel..	34⅝- 41
Int. Har. com...	94½- 96¾	Va. I. C. & C...	86¾- 88
Int. Har. pf..... ..	-106	Westghouse Elec.	44 - 45⅝

Dividends

The regular quarterly dividend of 1¾ per cent on the outstanding preferred stock of the Taylor-Wharton Iron & Steel Co. for the three months ending Dec. 31, 1920, has been declared.

Industrial Finances

The report of the Nash Motor Co. for the fiscal year ended Nov. 30 last shows net profits after all charges and taxes of $7,007,471, which after preferred dividend requirements is equal to $122.79 a share on the 54,400 common shares. During the previous year the company earned $95.06 on 50,000 common shares. Sales were $57,000,000, contrasted with $41,754,003 for the previous year.

A voluntary petition in bankruptcy has been filed by the Wisconsin Die Casting Co., 123 Reservoir Avenue, Milwaukee. Liabilities of $19,292.93 and assets of $27,836.07 are scheduled. Gustave R. Hinz is president.

The Electric Alloy Steel Co., Youngstown, Ohio, has called for payment of the remaining 40 per cent of the original subscription of $2,000,000 of its capital stock. Payments are asked in equal amounts Jan. 15, Feb. 15, March 15, and April 15.

EXPORT CONTINUES DULL

Good Connections Needed for Continental Buying—American Builder Resumes Work in Japan

NEW YORK, Jan. 18.—Exporters note but little change in the foreign trade situation. Some fairly large business is being done by exporters of pipe to South American markets and United States possessions but in most materials continental quotations preclude competition by the American exporter on price, unless, as has been the case in a few instances, he ships Belgian or German steel direct to the customer. This method of exporting, however, it is rather generally conceded, necessitates good connections on the continent and entails considerable risk of lost profit with exchange fluctuating as violently as it has recently. With a 5 to 10 per cent rise in the value of foreign currency between the date of purchase and the date of shipment and collection on letters of credit such business might represent a loss.

The moratorium is still in effect in Cuba and business relations are not satisfactory, but with the prospect of American intervention financially, exporters look forward to an early change for the better. British houses which import and re-export to all markets are buying largely in Belgium and Germany. The New York office of a British company reports that the best quotations possible to the London office on semi-finished material at present is about $53 per ton, c.i.f. England, while Belgian sellers are able to deliver in England at about $40 per ton and make a fair profit.

Japanese buying, which begins to show considerable activity is confined chiefly to the Imperial Government and large shipyards. Inquiries for electric cranes and other machinery is heavy with some inquiry for structural steel. A large construction company in New York, which received a $5,000,000 building contract for Tokio in the spring of 1920 has sent the engineers to Japan who were recalled at the time of the panic in April.

OFFICE CHANGES

The Boston office of the Reliance Electric & Engineering Co. has been moved from 10 High Street, room 721, to 200 Devonshire Street, room 566. Langdon S. Simons represents the concern.

The Mesta Machine Co., Pittsburgh, has opened a branch office at Chicago, which is temporarily in the Railway Exchange Building but will be moved to permanent quarters in the McCormick Building April 1. C. J. Mesta, second vice-president of the company, will be in charge. He will be assisted by W. R. Dawson and R. W. Schutte, who are to be transferred from Pittsburgh.

The W. R. Miller Co., designer and builder of metallurgical furnaces, of Forter water seal valves and gas producers, and Siemans valves, now located in the House Building, Pittsburgh, expects to move into its own building, now nearing completion, about Feb. 1. The building is located at 609 Boggs Avenue, corner Jasper Street, South Side, Pittsburgh.

The Universal Tobacco Machine Co. has moved into its new factory, 196 Mount Pleasant Avenue, Newark, N. J.

The Consolidated Machinery & Wrecking Co. will change its address to Harris and East avenues, Long Island City, N. Y.

The Pittsburgh office of the Stewart Iron Co., Sharon, Pa., Clyde Brooks, district sales manager, has been removed from 1515 Farmers' Bank Building to room 1502 in the same building.

The Clay Products Co. of America, Liberty Building, Philadelphia, will build a new electric power plant in connection with its brick manufacturing plant at New Hope, Pa., estimated to cost about $900,000, with equipment. In addition to brick-making machinery, the installation will include an industrial railroad system and hoisting and conveying machinery.

The Young & Franklin Tool Works, Inc., New York, has been incorporated with a capital of $100,000 by D. J. Young, K. and P. G. Franklin, Liverpool, N. Y., to manufacture tools, machine parts, etc.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	0.695
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.78
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.33	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.78		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e. New York, Philadelphia and Baltimore), to Pacific Coast ports of call on all steamship lines via the Panama Canal are as follows: Pig iron, 55c.; ship plates 70c., ingots and muck bar, structural steel, tin plate, sheets, common wire products, 75c.; pipe not over 8 in. in diameter, 85c.; over 8 in. in diameter, 2½c. per inch, or fraction thereof additional.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in., angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 2.45c.

Wire Products

Wire nails, $3.25 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.50 and shorter than 1 in., $2. Bright Bessemer and basic wire, $3.25 per 100 lb.; annealed fence wire, Nos. 6 to 9, $3.25; galvanized wire, $3.95; galvanized barbed wire, $4.10; galvanized fence staples, $4.20; painted barbed wire, $3.40; polished fence staples, $3.50; cement-coated nails, per count keg, $2.85; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 58 to 60½ per cent off list for carload lots, 57 per cent for 1000-rod lots, and 56 per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$4.00
Large boiler rivets.....4.10
Small rivets.....60 per cent off list
Small machine bolts, rolled threads.....60 per cent off list
Same sizes in cut threads.....50 and 10 per cent off list
Longer and larger sizes of machine bolts
45 and 5 per cent off list
Carriage bolts, ⅜-in. x 6-in.:
Smaller and shorter, rolled threads
40, 10 and 5 per cent off list
Cut threads.....40 and 5 per cent off list
Longer and larger sizes.....40 and 5 per cent off list
Lag bolts.....60 per cent off list
Plow bolts Nos. 1, 2 and 3 head.....50 and 5 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts ⅜-in. x 4-in.:
Smaller and shorter.....40, 10 and 5 per cent off list
Longer and larger sizes.....40 per cent off list
Hot pressed sq. or hex. blank nuts.....$2.25 off list
Hot pressed nuts, tapped.....$1.75 off list
C. p. c. & t. sq. or hex. nuts, blank.....$2.25 off list
C. p. c. & t. sq or hex. nuts, tapped.....$1.75 off list
Semi-finished hex. nuts, U. S. S. and S. A. E.:
⅛ to 9/16-in. inclusive.70 and 10 to 75 and 10 per cent off list
⅝ to 1 in. inclusive.....65 to 70 per cent off list
Stove bolts in packages.....75 and 10 per cent off list
Stove bolts in bulk.....75, 10 and 2½ per cent off list
Tire bolts.....50 per cent off list
Track bolts.....5.50c. base

Square and Hex. Head Cap Screws

½ in. and under.....65 and 10 to 70 per cent off list
9/16 in. to ¾ in.....65 to 70 per cent off list

Set Screws

½ in. and under.....70 and 5 to 70 and 10 per cent off list
9/16 in. to ¾ in.....65 and 10 to 70 per cent off list

One cent per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size, or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $57; chain rods, $57; screw stock rods, $62; rivet and bolt rods and other rods of that character, $57; high carbon rods, $68 to $75, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $3.65 per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅜-in. and 7/16-in., $4.50; 5/16-in., $5.25. Boat and barge spikes, $4.50 per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $5.50 base per keg of 200 lb. Tie plates, $3 to $3.60 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $13.80 per package; 8-lb. coating, I. C., $14.10; 12-lb. coating, I. C., $15.80; 15-lb. coating, I. C., $16.80; 20-lb. coating, I. C., $18.05; 25-lb. coating, I. C., $19.30; 30-lb. coating, I. C., $20.30; 35-lb. coating, I. C., $21.30; 40-lb. coating, I. C., $22.30 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.35c. from mill. Refined bar iron, 3.75c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛, ¼ and ⅜	50½	24	⅛	15½ to 16½	+10½ to 11½
½	54½	40	¼	19½ to 20½	1½ to 2½
¾ to 3	57½	44	⅜ to 1½	24½ to 25½	8½ to 9½

Lap Weld

2	50½	38	2	20½ to 21	6½ to 7
2½ to 6	53½	41	2½ to 6	22½ to 23	9½ to 10
7 to 12	50½	37	7 to 12	19½ to 20	6½ to 7
13 and 14	41				
15	38½				

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	46½	29	⅛	+16 to 17	+49 to 50
½	51½	39	¾	13½ to 14½	+2½ to 3½
¾ to 1¼	55½	43	½	18½ to 19½	5½ to 6½
2 to 3	56½	44	¾ to 1¼	24½ to 25½	9½ to 10½

Lap Weld, extra strong, plain ends

2	48½	37	2	21½ to 22½	8½ to 9
2½ to 4	51½	40	2½ to 4	23½ to 24	11½ to 12
4½ to 6	50½	39	4½ to 6	22½ to 23	10½ to 11
7 to 8	46½	33	7 to 8	14½ to 15	2½ to 3
9 to 12	41½	28	9 to 12	9½ to 10	+2 to 2½

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers have been seven (7) points lower (higher price) than carload lots and on butt and lap weld galvanized iron pipe have been nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ to 2 in.	19½	1½ to 1⅝ in.	+ 23
2¼ in.	24	1¾ to 1⅞ in.	+ 20
2½ to 3¼ in.	30½	2 in.	+ 10 to 15
3½ to 4½ in.	40½	2¼ in.	+ 10 to 12
		2½ in.	+ 1 to 10
		2¾ to 3¼ in.	— 1½ to + 3
		3½ to 4½ in.	— 8

Standard Commercial Seamless—Cold Drawn or Hot Rolled

Per Net Ton		Per Net Ton	
1 in.	$327	1¾ in.	$207
1¼ in.	267	2 to 2½ in.	177
1⅝ in.	257	2¾ and 3¾ in.	167
1½ in.	207	4 in.	187
		4½ to 5 in.	207

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department which will be subject to special negotiations.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

	Cents Per Lb.		Cents Per Lb.
No. 8 and heavier	3.45	Nos. 13 and 14	3.65
Nos. 9 and 10 (base)	3.55	Nos. 15 and 16	3.75
Nos. 11 and 12	3.60		

Box Annealed, One Pass Cold Rolled

	Cents Per Lb.		Cents Per Lb.
Nos. 17 to 21	4.15	No. 28 (base)	4.35
Nos. 22 to 24	4.20	No. 29	4.45
Nos. 25 and 26	4.25	No. 30	4.55
No. 27	4.30		

Galvanized Black Sheet Gage

	Cents Per Lb.		Cents Per Lb.
Nos. 10 and 11	4.70	Nos. 25 and 26	5.40
Nos. 12 to 14	4.80	No. 27	5.55
Nos. 15 and 16	4.95	No. 28 (base)	5.70
Nos. 17 to 21	5.10	No. 29	5.95
Nos. 22 to 24	5.25	No. 30	6.20

Tin-Mill Black Plate

	Cents Per Lb.		Cents Per Lb.
Nos. 15 and 16	4.15	No. 28 (base)	4.35
Nos. 17 to 21	4.20	No. 29	4.40
Nos. 22 to 24	4.25	No. 30	4.40
Nos. 25 to 27	4.30	Nos. 30½ and 31	4.45

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York			Lead		Zinc	
Jan.	Lake	Electro-lytic	Tin New York	New York	St. Louis	New York	St. Louis
12.....	13.25	13.00	38.25	5.12½	4.90	6.00	5.55
13.....	13.25	13.00	38.00	5.12½	4.90	6.00	5.55
14.....	13.25	13.00	37.00	5.12½	4.90	6.00	5.55
15.....	13.25	13.00	....	5.12½	4.90	6.00	5.55
17.....	13.25	13.00	35.75	5.12½	4.90	6.00	5.55
18.....	13.25	13.00	34.75	5.12½	4.90	6.00	5.55

NEW YORK, Jan. 18.

Demand for all of the metals is only moderate but in most cases prices are steady to firm. The copper market is quiet and slightly firmer. Tin has declined in sympathy with the London market. Lead has been active but is again quiet. The zinc market is entirely stagnant.

New York

Copper.—There has been scarcely any improvement in the domestic demand for copper but foreign buying is fairly good, as judged by recent standards. Some interests outside of the Copper Export Association report a better demand than in some time and the advance in exchange values has helped the situation slightly. We quote electrolytic copper for prompt and early delivery at 13c. to 13.25c., New York, with first quarter at 13.25c. to 13.50c., there being some sellers at all of these various levels. The market for Lake copper is exceedingly quiet at 13.25c. for prompt and early delivery and 13.50c. for first quarter.

Tin.—The week has been a quiet one with a fair business transacted between dealers each day. Consumers, however, do not appear anxious to buy and are evidently amply supplied with stocks. A restraining element is the poor demand for finished materials into which tin enters. Nevertheless the tone of the entire market is more optimistic. Yesterday an unconfirmed report was to the effect that the Malay Government had reduced the minimum price of tin to £230 from £237, at which it would buy unsold tin from producers. From this cause or from some other the London market declined yesterday and today, spot standard tin today being quoted at £180 10s., futures at £185 10s. and spot Straits at £196. These levels are lower than in nearly a year. In this market spot Straits tin after a week of fairly high prices had declined today to 34.75c., New York, despite the fact that sterling exchange has been advancing in the week. The feature of the week in news interest was the testimony last Thursday before the Ways and Means Committee of Congress by William Loeb, of the American Smelting & Refining Co., advocating an import duty of 10c. per lb. on pig tin and 6c. per lb. on tin in ores and concentrates. This would amount to a protective tariff for the tin industry and be equivalent to an increase of 4c. per lb. for American tin.

Lead.—Toward the end of last week the market turned considerably quieter, but it is still decidedly firm. The outside market is fairly established at 5.12½c., New York, or 4.90c., St. Louis, at which level sales have been made. A good tonnage has been booked at these and slightly lower prices. The leading interest continues to quote 4.75c., New York and St. Louis, but has generally been credited with taking no business at these levels. It was rumored, however, that it had offered to book business at those prices, but this has been unconfirmed, although some sales have been made recently as low as 4.75c.

Zinc.—There has been no improvement in the zinc market and demand is almost negligible. Prime Western for early delivery is quoted at 5.55c., St. Louis, or 6c., New York. The absorbing topic is the advocacy of a tariff, it being claimed that foreign zinc can be delivered at seaboard at under 6c., while American zinc cannot be produced at a profit at less than 8c. The principal cause of the depression in the market is the possibility of imports.

Antimony.—Wholesale lots for early delivery are quoted at 5.15c., New York, duty paid, with demand light.

Aluminum.—Virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery, is quoted by the leading interest at 28.30c. f.o.b. producer's plant, but is obtainable from other sellers at 22½c. to 23½c., New York.

Old Metals.—The undertone in the market is stronger though little business has been transacted. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.75
Copper, heavy and wire	12.00
Copper, light and bottoms	10.00
Brass, heavy	9.25
Brass, light	6.75
Heavy machine composition	12.50
No. 1 yellow rod brass turnings	7.50
No. 1 red brass or composition turnings	10.00
Lead, heavy	4.00
Lead, tea	3.00
Zinc	3.25

Chicago

Jan. 18.—There has been moderate buying of copper, principally by dealers and speculators. Tin has declined slightly, apparently because the recent advance overreached itself. Lead is the strongest of the metals, but much of current inquiry is for distant delivery on which producers are disinclined to quote. Spelter and antimony are quiet and without features. Old metal prices are unchanged. We quote Lake copper at 13.50c. in carload lots; tin, 37c. to 38c.; lead, 4.95c.; spelter, 5.65c. to 5.75c.; antimony, 7c. to 7.50c. On old metal we quote copper wires, crucible shapes, 9c.; copper clips, 9c.; copper bottoms, 7.50c.; red brass, 9c.; yellow brass, 6c.; lead pipe, 3c.; zinc, 3c.; pewter, No. 1, 17c.; tinfoil, 20c.; block tin, 25c.; all these being buying prices for less than carload lots.

St. Louis

Jan. 17.—The non-ferrous markets were rather quiet, with relatively little doing in either the car lot or less than car lot quantities. On car lots we quote: Lead, 4.90c.; spelter, 5.60c. In less than car lots we quote: Lead, 5.50c.; spelter, 6.25c. to 6.50c.; tin, 42c.; copper, 13.50c.; antimony, 7.50c. In the Joplin district ores continue at low levels and the sales are running less than half the usual production of the district because of the indisposition of miners to mine and sell at present prices. Quotations remain about the same as last reported. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 4c.; heavy yellow brass, 6.50c.; heavy red brass, 10c.; heavy copper and copper wire, 10c.; light copper, 9c.; zinc, 3c.; lead, 4c.; tea lead, 2c.; pewter, 18c.; tinfoil, 20c.; aluminum, 10c.

On Jan. 1 the Detroit Heating & Lighting Co. ceased to function as a company. It was absorbed by the Welded Steel Barrel Corporation, Detroit. This location will be known as the Welded Steel Barrel Corporation, Plant No. 2. All material purchased for Plant No. 2 will be delivered to the Detroit Heating & Lighting Co.'s old plant. All material will be invoiced directly to the main office, the Welded Steel Barrel Corporation, Plant No. 1.

The Great Western Contracting Co., Kansas City, Mo., representative for the Conveyors Corporation of America, Chicago, has changed the name of its organization to the Rawlings Industrial Equipment Co. This organization is sales engineer for the manufacturers of power plant machinery, and the new name outlines their functions admirably.

The Foundation Co., New York, has been awarded the contract for the construction of the northern approach to the new Cincinnati Southern Railroad Bridge over the Ohio River at Cincinnati. The cost of the approach will be about half a million dollars.

PERSONAL

Walter F. Ingals was elected vice-president of the Central Tube Co., Pittsburgh, at a recent meeting of the directors in addition to the office of general sales manager, which he has occupied since the formation of the company in 1909.

Andrew J. Sloper, president New Britain National Bank, New Britain, Conn., has resigned as director of the New Britain Machine Co., that city, automatic machinery, etc. The vacancy has not been filled as yet.

A. S. Taylor, formerly of the Bethlehem Steel Co., the Allegheny Steel Co., and for the past eight years chief engineer of the United Alloy Steel Corporation, Canton, Ohio, has gone to California to accept a position with the Moreland Truck Co. at its new plant in Burbank.

Winfred A. Place was elected president of the Warren Belting Co., Worcester, Mass., at the annual meeting; William H. Bowman, treasurer; and William H. Warren, assistant treasurer.

Charles B. Freeman, has been made employment manager of the Stanley Works, New Britain, Conn. He succeeds W. E. Hine, who resigned to enter another line of business.

Henry Reeve, formerly secretary Stocker-Rumely-Wachs Co., Chicago, has become associated with the Dale Machinery Co., 547 West Washington Boulevard, where he will have charge of credits and general office work.

Edward C. Gaines, Mead Morrison Mfg. Co., Chicago, is now in Australia in charge of the erection of a large coal handling plant at Sydney, and is looking after other interests of the above company. The work involves a large amount of structural steel and it is the intention to have the steel fabricated in Australia. The erection work will be organized and carried on with local labor.

A. E. Blake has been appointed representative of the U. G. I. Contracting Co., Philadelphia, in the Pittsburgh district, beginning Jan. 1, with offices in Union Arcade.

William Printz, sales engineer, has assumed charge of the New York territory for the Wilson-Maeulen Co., manufacturer of pyrometers. He has been actively associated with the sale and installation of pyrometers throughout the Middle West for the past five years. Mr. Printz will have his headquarters at the main office and works, 383 Concord Avenue, New York.

Fred H. Atwood, formerly sales manager Millers Falls Co., Millers Falls, Mass., hardware, is now general manager of the Bethlehem Laboratories, Bethlehem, Pa.

C. R. Weber was elected treasurer of the Sherritt & Stoer Co., machine tools, Philadelphia, at a meeting of the board of directors, on Jan. 10, filling a vacancy made through the retirement of C. H. Stoer some time ago. Mr. Weber was previously in charge of the accounting department.

W. S. Murray, chairman Super-Power Survey, Department of the Interior, Washington, spoke on "Electrical Features of the Super-Power Survey" in Lorimer Hall, Jan. 18, before the Boston section, American Institute of Electrical Engineers; Boston section, American Society of Mechanical Engineers, and the Society of Civil Engineers.

Joseph H. Hunter, president Detroit Insulated Wire Co., has recovered sufficiently from a recent automobile accident to be removed from a hospital to his home, Pasadena Apartments, 2170 Jefferson Avenue, Detroit.

Hugh A. Brown has been appointed sales manager, effective Jan. 15, of the Electro Dynamic Co., motors and generators, Bayonne, N. J. He will have his office at the Bayonne works. He has had sales experience with the Crocker Wheeler Co. and Burke Electric Co.

A. P. Fall has resigned as production manager of the Toledo Bridge & Crane Co., Toledo, Ohio, with which he has been connected for 15 years, and is now vice-president and general manager of the Welever Piston Ring Co., Toledo.

Confirmation of the nomination of H. Foster Bain to be chief of the Bureau of Mines is expected to be made by the Senate at the coming extra session of Congress. In the meantime he will continue in office under his recent appointment by President Wilson. Mr. Bain was editor of the *Mining and Scientific Press* from 1909 to 1915, and then for a short time was editor of the *Mining Magazine* in London before going to China in 1916. From there he was called in 1917 to become assistant to Van H. Manning, at that time director of the Bureau of Mines and during the war followed up the production of metal products, explosives and various war chemicals. In 1918 he resigned to return to China, where he was engaged in the examination of mines for an important Anglo-American syndicate. He returned to this country in November. By that time he had been invited to succeed Dr. Cottrell and after some hesitancy he accepted the appointment, being urged to do so by many of his friends. Graduating from Moore's Hill College, Ind., in 1890, Mr. Bain spent two years at Johns Hopkins University and later received his doctor's degree from the University of Chicago. He has been for many years a prominent and active member of the American Institute of Mining and Metallurgical Engineers, the Mining and Metallurgical Society of America and the American Mining Congress. He practiced as a mining engineer in several States and has traveled in many countries. For four years he was State geologist of Illinois and he has lectured on economic geology at several universities.

A. E. Hogrebe, mechanical and electrical engineer, Baltimore, has been appointed sales engineer for the Baltimore territory of the Champion Engineering Co., Kenton, Ohio, manufacturer of electric traveling cranes. Mr. Hogrebe has been identified with the design and later with the manufacture and sale of electric traveling cranes since 1891, having been connected with the Yale & Towne Mfg. Co., Brown Hoisting Machinery Co., Pawling & Harnischfeger, and the Niles-Bement-Pond Co. In 1917 Mr. Hogrebe designed and was in charge of the manufacture as manager of the Chesapeake Iron Works, Baltimore. He recently severed his connection with that company and sold all his stock in it.

S. Walter Platt, who retired as Pittsburgh district manager for Luria Bros. & Co., Inc., New York and Lebanon, Pa., dealer in iron and steel scrap, as announced in THE IRON AGE of Jan. 13, has become Pittsburgh manager of the recently-organized American Foreign Steel Corporation. Offices are located temporarily at 997 Union Arcade Building.

S. G. Porter and E. I. Porter, for many years with the D. Nast Machinery Co., Philadelphia, have resigned, and with J. R. Richards, formerly with the Fairbanks Co., have organized the Porter-Richards Machinery Co. with offices at 19 South Seventh Street, Philadelphia, to sell machine tools and accessories.

F. N. Speller, metallurgical engineer National Tube Co., will address a joint meeting of the Ontario section of the American Society of Mechanical Engineers and the Engineering Institute of Canada at the King Edward Hotel, Toronto, Feb. 2, on effects of corrosion on steel pipe and the manufacture of steel pipe up to 96 in. in diameter.

R. E. Ludwick, sales manager Cleveland Crane & Engineering Co., Cleveland, has severed his connection to become sales manager of the Grid Iron Grip Wheel Co., Toledo, Ohio.

Richard M. Heames, treasurer Victor Screw Works, Detroit, has been elected to the board of directors of the American State Bank, Detroit.

Rowland LeBarre, Interstate Iron & Steel Co., 104 South Michigan Avenue, Chicago, has been elected chairman of the committee of creditors which has taken charge of the affairs of the John Obenberger Forge Co., Milwaukee. J. F. Gurdis has been elected secretary

of the committee, with headquarters at the Obenberger offices in Milwaukee.

Ernesto D'Amico, formerly with the Italian Mission in the United States and general agent in Italy for F. R. Phillips & Sons, Philadelphia, who has been in the United States for the past four weeks on a business trip, sails on the Imperator on Jan. 20. His headquarters are at Milan.

Cecil M. Sanders, London representative of the Consolidated Steel Corporation, arrived in New York this week on a brief business trip.

Fabricated Steel Business in 1920

The total volume of bookings of fabricated steel business in 1920 was about 1,161,700 tons, or slightly greater than the volume of 1919, which was 1,157,400 tons. Compared with 1918, when there was considerable activity through the fabricated shipbuilding movement—1920 is only 40,700 tons less.

The December volume kept up the average of the last quarter, being 47,000 tons of bridge and building work, or 26 per cent of the country's capacity. The volume of business in the last half of 1920 was somewhat less than half of the volume for the first six months of the year. The amount of business done in February, 1920, 171,000 tons, was higher than in any month of 1919, and there were four months in 1919, showing the stagnation following the signing of the armistice, in which the volume was less than in any month in 1920. In fact, the total for the first four months of 1919 was less than 120,000 tons, while the total of the last quarter of 1920 was about 142,000 tons.

Pneumatic Rod Cutters

Machines for cutting all sizes of rods within their range at a minimum of 60 lb. of air pressure without any change or adjusment being made are a recent product of Scully-Jones & Co., 80 East Jackson Boulevard, Chicago. The machine will operate without change, it is stated, as well with steam as with air. It is made in two sizes, a small machine cutting from 0 up to ⅜ in. in diameter and a large machine cutting from 0 to ⅝ in. in diameter.

Safety to the workman is emphasized as a feature, as the only moving part which the workman can touch is the knee-pad. Upkeep expense, it is explained, is small, as the only parts that can wear are the cutters. These are round ring cutters and as they wear can be turned so as to give each cutter 10 new cutting edges. The amount of air consumed in operation is small, as travel of the piston in the ⅜-in. machine is ½ in. and in the ⅝-in. machine is ⅞ in. Speed of operation is also emphasized as a feature.

Machines can be installed on permanent benches, or on portable benches on wheels. An air hose can then be run to the machine, enabling it to be taken to the job.

It is announced that an electrolytic zinc refinery is to be built by the Bunker Hill & Sullivan Mining & Concentration Co. at Kellogg, Idaho. The initial capacity of the new refinery will be 25 tons per day, and it is said it will take about two years to build the plant. Considerable equipment will be needed.

The decrease in the cost of living as compiled by the Department of Labor for 32 cities of the country averages 6.73 per cent in December from the high level of June, 1920. The city showing the smallest decrease is Los Angeles, 2.5 per cent, and the city showing the largest is Portland, Oregon, 10 per cent.

The American Steel & Wire Co., Worcester, Mass., has permission to erect a three-story, 144 x 120 ft. addition to its south works plant, an extension to the electric cable department, making it about one-third larger. Later, the company may extend its coal pockets and improve its method of handling fuel.

OBITUARY

HERMAN GARLICHS, 61 years old, 262 Gates Avenue, Brooklyn, a leading metallurgist and during the World War an advising metallurgist as a "dollar-a-year man," died of heart trouble on Jan. 8, at his home. He was born in Brooklyn on May 23, 1859. He was graduated from the Columbia School of Mines in 1880 and soon after went to Colorado where he became a United States deputy mineral surveyor. As a mining expert and metallurgist he was associated from 1884 to 1908 with various smelting companies in the West, and later with the Balbach Smelting Co., Newark, N. J. He retired from active business a few years ago, and aside from his service with the Government in the war, had since been an expert adviser in mineralogy, mining and smelting and refining of ores. He was a member of the American Institute of Mining and Metallurgical Engineers and the Mining and Metallurgical Society of America.

EDWARD T. MCHUGH, a veteran foundryman of Holyoke, Mass., died Jan. 9 in the city hospital, that city. He was born at Canton, Mass., Nov. 20, 1845. At the age of 13 he started learning the molder's trade. After the Civil war he worked at the Knowles Steam Pump Works, Warren, Mass. In 1880 he located in Holyoke and for the following 13 years was manager of the foundry department of the Dean Steam Pump Co. Later he established the McHugh Foundry Co. A son, Edward B. McHugh, is a foreman for the Holyoke Foundry Co.

E. C. PARSHALL, general manager Bay City Forge Co., hammered steel forgings, Erie, Pa., died on Jan. 11.

WILLIAM H. BENT, for many years treasurer Mason Machine Works, Taunton, Mass., textile machinery, died Jan. 13 at his home there. He was 82 years old.

E. C. HINMAN, president American Steam Pump Co., Battle Creek, Mich., died Jan. 11, after a long illness. He was also president of the Central National Bank, Battle Creek, and member of the board of directors of the Commonwealth Federal Savings Bank, Detroit.

SIR FRANK BAILLIE died recently in Wellesley Hospital, Toronto, Ont. He was president of the Canadian Aeroplanes, president of the Canadian Cartridge Co., Hamilton, Ont., and president of the Burlington Steel Co., Hamilton.

ELMER ALLEN BEAMAN, until recently treasurer and general manager Beaman & Smith Co., Providence, R. I., machinist, died Jan. 4, at his home in that city, following a long illness. Mr. Beaman was born in Worcester, Mass., Sept. 2, 1846. He established the above firm in 1886.

JOHN HENRY EASTWOOD, owner of the Eastwood Wire Mfg. Co. and the Eastwood Chemical Co., both of Belleville, N. J., died of heart disease Jan. 11 at his winter home at Miami, Fla., at the age of 67. The companies had been left to him by his foster father, the late John Eastwood, founder of both plants. He was prominent in civic affairs and belonged to many clubs.

HUGH N. CAMP, vice-president and treasurer St. Joseph Lead Co., died Jan. 17 at his home in New York.

MARVIN F. SCAIFE, for many years with William B. Scaife & Sons Co., Pittsburgh, died suddenly at his winter home in Miami, Fla., Jan. 13. He was born in Pittsburgh, Oct. 25, 1855, and made his home in that city throughout his life. He retired from active connection with William B. Scaife & Sons Co. several years ago on account of ill health following a series of surgical operations. He had devoted himself to philanthropic work in recent years and had been chairman of the executive committee of the Co-operative Welfare Association of Pittsburgh.

Officials of the Wheeling Steel Corporation, Wheeling, W. Va., have organized the Wheeling Steel Products Co., with capital of $1,000,000 to operate as an exclusive sales branch of the parent organization. W. H. Abbott, vice-president of the latter company, is president of the new organization.

The Chain Industry in Great Britain

(*Continued from page* 186)

uct, as the only equipment is the forge and anvils in small chains and the power hammers of some sort on the heavier sizes. The forges are usually provided with some sort of power blower, driven either by steam or electricity, but power charges are also negligible. In machine-made chains, the labor becomes a much smaller factor and power and other charges constitute an appreciable percentage of the total costs.

The following distribution of expenses in percentages of the selling prices may be given as representative of the operations in 1919 of several of the largest firms making both hand welded and machine welded chains.

Item	Per Cent of Selling Price
Raw material, including fuel for forges	45
Wages	27
Power	04
All other manufacturing costs	11
Profit	13
	100

The above distribution is not satisfactory in that it does not distinguish between hand and machine welded chain, but it serves to bring out the extreme importance of raw material and also the profits accruing to the chain makers in spite of the relatively high wages they were paying. The trade is prosperous and all plants are well supplied with orders for months ahead. A much greater proportion of the business is now done direct than formerly and there is an effort being made to eliminate the middleman, although a large fraction of the British output of chains of all kinds are still sold through merchants. None of these merchants, however, are members of the Chain and Anchor Manufacturers' Association.

Will Not Collect Union Dues

The Pittsburgh Coal Producers' Association has notified officials of District No. 5, United Mine Workers of America, that the organization would refuse to deduct under the "check off" system $1 a month from miners' wages, levied by the union for the support of striking miners and their families in the Mingo county, W. Va., and the Alabama fields. In a letter to district headquarters of the union the association said: "We have been advised by counsel that the operators of the Pittsburgh district cannot be a party to the collection of the assessments referred to in your letter and the official circular, for the purposes specified therein. Therefore, we decline to approve and make collection of the assessments. The operators have no knowledge of the purposes for which the money collected under the 'check off' practice is expended by your organization. We have only continued the same because of the refusal of the President's commission to grant our demand for its abolition. We emphatically protest against the use of any funds collected by this method for the purposes specified in the official circular."

Earl F. Whitaker has established his own business as manufacturers' agent and distributor, giving service to buyers of steel, fuel and factory supplies. His office will be at 2523 Park Row Building, 15 Park Row, New York. He has had 20 years' experience in this line of work.

The Interstate Iron & Steel Co., Chicago, has added equipment at its East Chicago plant for making cold-finished steel bars and shafting.

The Midvale Steel & Ordnance Co. has received an order from the Southern Pacific Railroad for 1000 tons of locomotive tires.

UNION LABOR MEETING

American Federation Plans to Fight Open Shop Movement—Important Court Cases

WASHINGTON, Jan. 18.—Recent reiteration of business interests of their adherence to the open shop policy and their attitude as to labor injunctions, have been seized upon by the American Federation of Labor to inaugurate anew a campaign in favor of its own policies. With this object in view, Secretary Frank Morrison of the federation has announced a meeting of the national and international unions affiliated with the federation will be held here Feb. 23. Union officials are laying great stress upon the importance of the meeting and say that its character, involving not only national organizations, but those of other countries as well, denote its significance.

Recent and Coming Decisions

Organized labor is still agitated over the recent decision of the United States Supreme Court in the Duplex Printing Co. case holding the secondary boycott is unconstitutional. It also apparently is anticipating other adverse decisions, chief among those being what are known as the Truax case, coming from Arizona, and the Coronda Coal Mining Co. case coming from Arkansas, and if they prove to be unfavorable to labor, they will strike additional blows against its attempts to have class legislation enacted.

The former case, briefly, relates to the right to issue injunctions against labor. The Arizona legislature has passed a law prohibiting the issuance of injunctions, as contrasted with a ruling from the Supreme Court of Massachusetts that such legislation, which was proposed in that State, would be unconstitutional. The Coronda case, already passed upon by two lower courts unfavorably to organized labor, involves the right of a coal operator to collect damages from unions as organizations, rather than individuals composing them, for damage to property, and has some of the elements that entered into the Danbury hatters' case, though the latter permitted the collection of damages against individuals. It will be readily observed that these two cases are highly important as to the rights of employers.

Will Discuss the Courts

All of these questions, it is understood, are to be taken up at the forthcoming meeting of organized labor interests, which will be presided over by President Samuel Gompers of the American Federation of Labor, who issued the call for the conference. It is claimed it will be attended by representatives of 109 national and international unions affiliated with the federation. Mr. Morrison said it will be held "for the purpose of considering attacks now being made on the trade union movement." He went on to state that these attacks include attempts to establish the anti-union shop, wage reductions, compulsory arbitration, labor injunctions and a publicity campaign that would mold the public mind to "accept these backward steps." Belief was expressed by him that labor will form a plan "to expose the pretense of men who are only interested in cheap labor and a continuance of their profiteering policy." They are mistaken, he added, if they "imagine that they have made the slightest progress in alarming workers or that they will humbly accept a policy of reaction."

The conference, according to Mr. Morrison, is one of several similar gatherings that have been called by the American Federation of Labor during its history to consider unusual conditions, and is of importance.

The meeting is timed for a short period previous to the Harding administration taking office, so that it can complete preparation of data outlining its program which is expected to be laid before President Harding and his administration to denote their purposes as to legislation which they will favor or oppose. In the meantime it is apparent that organized labor is going to intensify its publicity work in connection with advocating "a new bill of rights."

BOOK REVIEWS

Advertising the Technical Product. By Clifford Alexander Sloan and James David Mooney. Pages x + 365, 6 x 9 in.; numerous illustrations. Published by McGraw-Hill Book Co., 239 West Thirty-ninth Street, New York, and for sale by THE IRON AGE Book Department.

Advertising of the technical product has developed largely within the last thirty-five years, with accelerated progress in latter years. Early advertising copy, now viewed, appears archaic; lack of thought expended on the preparation of copy and illustrations is apparent. Contrasted with this, modern advertising shows such progress that it is becoming potentially a science and the laws governing its application are becoming rapidly formulated into a code. A commendable effort to analyze the principles involved in advertising the technical product marks this volume; to quote: "technical advertising men, generally, are applying sound principles to the promotion of sales by means of advertising. What technical advertising needs most badly, is an exposition of these principles, which are being used more or less sub-consciously by men who have mastered them through experience. These principles properly set forth will provide the basis for the science of advertising the technical product." Further, "there must be provided for the manufacturer of technical products, a means of applying more definitely and surely the forces of advertising that he may require at any particular time to solve his problem of filling his plant with business and keeping it filled."

In furtherance of this declaration, the authors have combined with their own efforts material furnished by well known executives who have been successful in the various phases of the work discussed. This with well illustrated copy has resulted in a well rounded discussion with the individual topics ably presented.

In the light of the general problem and its economic elements, the authors analyze the instruments available for advertising technical products—the technical and trade magazines, popular magazines and newspapers, direct mail advertising, prospectuses, bulletins, catalogs, house organs and educational work, including the functions of the advertising and sales promotion departments, technical and trade paper publicity, papers before engineering societies, and exhibitions. An analysis of the factors governing the selling power of the advertisement follows—weak and strong points are discussed and suggestions for providing the advertisement with effective sales force are given. Discussions are included on institutional advertising, which utilizes the institution behind the product to provide sales substance, the value of guarantees, advertising to the dealer and the collection of sales substance for advertisements.

A chapter on technical advertising display considers the purposes of display and display practice, functions of the illustrations, kinds of illustrations, borders, arrangements, etc. This is followed by detailed instructions on the technical advertising copy, including governing principles, headlines, use of superlatives, human interest appeal, technic of copy, technical accuracy and general copy angles. The book concludes with a consideration of advertising organizations: the advertising department, advertising council and the publishers service department. An appendix of real value gives criticisms of advertisements picked at random from technical, trade and popular magazines, the criticism of each advertisement being written by four practical men: a sales manager, advertising manager, sales engineer and purchasing engineer.

A number of points on which the authors have expressed definite conclusions are subject to differences of opinion. Although the reader may hold other views in such instances, the authors are rather to be commended for definite and frank statements where they have "disagreed here and there with phases of practice." The book is a commendable effort toward the advancement of technical advertising to that of a fixed science, "the introduction of laboratory methods into the solution of advertising and sales problems."

Powdered Coal as a Fuel.—By C. F. Herington. Pages, xii + 338, 6 x 9 in.; 124 illustrations. Published by D. Van Nostrand Co., 8 Warren Street, New York.

Since publication of the first edition of this book early in 1918, powdered coal has made material strides in industrial heating operations. This is given recognition in this second edition by revisions and the addition of 127 pages and 40 illustrations dealing with further applications of powdered coal and results attained. This new material includes a chapter on the effective utilization of powdered coal in metallurgical furnaces which discusses recent installations at various plants in annealing and air furnaces, core ovens, continuous heating and car wheel furnaces, copper reverberatory furnaces, forge furnaces, open hearths, rivet making furnaces, sheet and pair furnaces, tire furnaces, etc. This chapter is well illustrated with numerous installation views.

A review of the rapid advancement in the application of powdered coal to boilers since the earlier applications discussed in the first edition is given, with data on operating results and typical performances in locomotive boilers included. The new material also includes advice on the operation of the pulverized coal plant and a chapter of tables and useful data.

In chapters original with the earlier edition are discussed: Comparative costs with oil and gas; coals suitable for powdering; preparation, feeding and burning; application to reverberatory furnaces, metallurgical furnaces, boilers, and locomotives, and storage precautions.

"Research and Methods of Analysis of Iron and Steel" is the subject of an illustrated book of 220 pages, 6 x 9 in., bound in limp Karotel binding, published by the American Rolling Mill Co., Middletown, Ohio. This is the second edition of this book, published originally in 1912. The methods discussed are adapted particularly to the analysis of Armco products. A number of ancient irons are described, giving the history and chemical analyses, and data are given dealing with the gas content of iron and steel and the influence of various gases upon the rate of corrosion. On the subject of magnetic testing the core loss test, aging tests and permeability tests are described. A section on metallurgical control covers scientific heat treatment, thermoelectric and optical pyrometers, microscopic tests and physical tests including tensile, hardness, ductility and alternating stress methods. In a section on chemical analysis a number of new methods are included, among these being the determination of arsenic by the distillation method and the determination of boron by a volumetric method, which requires the use of mannite. Methods are also given for the determination of carbon, chromium, vanadium, hydrogen, nickel, oxygen and carbon monoxide, silicon, etc. A description of Dr. Cushman's method for the determination of spelter coating by measuring the hydrogen evolved is also included.

New Books Received

Manufacturing Industries in America. By Malcolm Keir, professor of economics Dartmouth College. Pages vii+324, 5¼ x 7½ in. Published by Ronald Press Co., 20 Vesey Street, New York.

Merchandising Studies of the States. By Archer Wall Douglas. Pages v+178, 5¼ x 7½ in. Published by Ronald Press Co., 20 Vesey Street, New York.

Proceedings of the American Society for Testing Materials. Part I, committee reports and tentative standards. Pages 848, 6¼ x 9¼ in. Part II, technical papers. Pages, 511, 6¼ x 9¼ in. Published by the American Society for Testing Materials, 1315 Spruce Street, Philadelphia.

Straight Business in South America. By James H. Collins. Pages ix+305, 5¼ x 8¼ in. Published by D. Appleton & Co., 35 West Thirty-second Street, New York.

Machinery Markets and News of the Works

TRADE IS MORE CHEERFUL

Change for the Better, However, Is Largely Sentimental

Inquiries More Numerous but Orders Are Few —Some Price Reductions

Whatever change has occurred in the machine-tool markets is largely sentimental, being based on the expectation that the improvement in evidence in certain other industries will be reflected eventually in larger machine-tool purchases. A modified optimism prevails, but the conservative view of the trade is that substantial buying of tools will not come for some months.

Two manufacturers of shapers, one in Ohio and one in the East, have reduced prices about 15 per cent. Although many tool builders have announced that they will make no reductions at present, there is some evidence of the holding back of business. An example of this is found in the inquiry of the National Lamp Works of the General Electric Co. for 100 machines, sent out about two months ago. Buying on this list was first postponed until January and now is again postponed until March. In Chicago the Santa Fe Railroad has reduced the size of its list for the Albuquerque, N. M., shops and has asked for new quotations, the inference being that buying may be dependent on price reductions.

An increased number of inquiries received by Cincinnati machine-tool builders leads them to believe that a turning point has been reached. No buying of importance has developed, but the inquiries are declared to be bona-fide. Eight lathes for export to South Africa and four for one of the Dutch colonies have been sold and a Japanese inquiry is under negotiation. Foreign business at present is largely contingent on liberal credit terms.

In the New York market there is a better tone, due to slightly greater inquiry, but buying is light. Used tools are in somewhat better demand, large planers and boring mills being very scarce and readily salable.

A sale of used and new tools at a Salem, Mass., plant last week developed some unusually low prices.

The Otis Elevator Co., New York, has issued an inquiry for about 20 tools for its Chicago plant.

New York

NEW YORK, Jan. 18.

With more than two weeks of the new year gone, the machine-tool trade is now in a better position to appraise the situation with respect to the possible revival of buying. Except for a slightly greater number of inquiries, most of which are for single machines, there is no tangible change as compared with December. However, it is apparent that sentiment is somewhat more cheerful, due to some extent to the improvement in business conditions in certain other industries. Reports coming from Detroit and other automobile manufacturing centers indicate a gradual resumption of manufacturing operations, which is encouraging, even though machine-tool builders recognize that it may be months before the automobile trade again enters the market for tools. There are pronounced signs of a revival of business in textile lines. As a good share of New England business in machine tools comes from textile mills and their affiliated interests, this, too, is an encouraging factor.

Much of the inquiry received in this market the past week or two is ostensibly for estimating purposes. While this may not result in buying in the immediate future, it is an indication that some manufacturers are actively planning on increased activities, and may buy as soon as improvement makes itself felt. A better demand for used tools is construed as a sign of a turn of the tide. Large tools are particularly needed, inquiries for boring mills and planers exceeding those of other types of machines. A machinery dealer says that he could easily sell several such large tools if he could obtain them.

Although there is a fair volume of new crane inquiries in the market, a good share seems to be for estimating purposes. The Parklap Construction Corporation, 84 Pine Street, New York, recently in the market for machine tools, is inquiring for two overhead traveling cranes for Long Island. The Foundation Co., New York, is receiving bids on one 10-ton, 80-ft. span and one 3-ton hand-power cranes for export to India, and the West Virginia Pulp & Paper Co., 200 Fifth Avenue, New York, is in the market for a 15-ton and 2-ton hand-power cranes. A large inquiry for Japan issued through Okura & Co., 30 Church Street, New York, includes two 200-ton and one 150-ton overhead traveling cranes. The M. W. Kellogg Co., Jersey City, N. J., in addition to electric cranes, is asking quotations on two hand-power cranes.

Among recent sales are: Ohio Locomotive Crane Co., a 35-ton, 70-ft. boom locomotive crane to H. P. Converse & Co., Boston, Mass.; Pawling & Harnischfeger Co., four 5-ton overhead traveling cranes, and the Shepard Electric Crane & Hoist Co., two 2-ton and two 5-ton cage control electric hoists to Dwight P. Robinson, Inc., New York, for Chattanooga, Tenn. The Gulf Refining Co., 21 State Street, New York, has purchased a 5-ton hand-power crane.

The Perfect Valve Grinder Corporation, New York, has been incorporated with a capital of $100,000 by M. C. Swartz, C. J. C. Schade and J. Baskin, 605 West 178th Street, to manufacture valve grinding equipment for automobile service, and other automotive products.

The Standard Coin Counter, Inc., 261 Dean Street, and the Johnson Coin Counting Machine Co., 10 Anable Street, Brooklyn, have been merged under the name of the Standard-Johnson Co., with capital of $500,000, to manufacture coin counting devices. The incorporators are C. S. Birdsall, L. J. and J. J. Donnellen, 416 Pacific Street, Brooklyn.

The Turl Iron & Car Co., New Windsor, N. Y., has increased its capital from $200,000 to $500,000.

The Estate of Adolph Starke, A. L. Starke, proprietor, Columbia and Sigourney streets, Brooklyn, is in the market for a used No. 2 back-geared or No. 2 Garvin tapping machine or equal.

The National Bridge Works, Review Avenue, Long Island City, N. Y., manufacturer of structural iron and steel, has increased its capital from $525,000 to $775,000.

Ira Malcolm and Vernon Westcott, 155 Central Avenue, Albany, N. Y., are taking bids for a one-story machine and repair works, 44 x 100 ft., at 440-42 Central Avenue, to cost about $25,000.

The O. Voigt Primer & Spark Plug Co., New York, has been incorporated with a capital of $100,000 by H. Wiener, J. G. and O. Voigt, 402 West Fifty-eighth Street, to manufacture spark plugs and ignition equipment.

The Regan Safety Devices Co., New York, recently organized to manufacture railroad safety equipment, has filed notice of increase in capital from $1,000,000 to $5,000,000. The company is headed by James B. Regan, Broadway and Forty-second Street, formerly head of the Knickerbocker Hotel, and James B. Regan, Jr., who will act as president and treasurer, and vice-president and secretary respectively.

The Sanibilt Specialties, Inc., New York, has been incorporated with a capital of $250,000 by J. Julius, H. Kleiman and D. Borton, 199 Penn Street, to manufacture refrigerator drip pans and other products.

The Times Appliance Co., New York, has been incorporated with a capital of $60,000 by B. A. and E. A. Allen

and E. B. Ingraham, 1475 Broadway, to manufacture electrical appliances and devices.

The plant of the Ontario Electric Steel Co., Fulton, N. Y., will be disposed of at a public sale. It is a subsidiary of the Century Steel Co. of America, Poughkeepsie, N. Y., specializing in the production of crucible, high speed and carbon steels.

The Star Metal Bed Co., Brooklyn, N. Y., has been incorporated with a capital of $100,000 by L. Sondack, L. and W. Levine, 466 Bainbridge Street, to manufacture iron and brass bedsteads, etc.

The Joseph Gaydica Iron Works, Brooklyn, has been incorporated with a capital of $200,000 by F. C. Spinner, J. Lippstadt and Joseph Gaydica, 225 East Third Street, to manufacture iron and steel products.

The Independent Wireless Telegraph Co., 42 Broadway, New York, manufacturer of wireless apparatus, has increased its capital to $500,000.

The Utica Valve & Fixture Co., Hubbell and Catherine streets, Utica, N. Y., has filed plans for rebuilding the portion of its plant recently destroyed by fire with loss reported at about $50,000.

The Durant Motors, Inc., New York, has been incorporated with an active capital of $5,000,000 to manufacture automobiles. It is headed by William C. Durant, former chairman General Motors Corporation, with other incorporators, including T. Thiesing, B. Lockwood and C. C. Rautenberg, 43 Cedar Street. It is planned to build works in the Middle West for the manufacture of a four-cylinder, popular-priced automobile.

The Olson Machine Works, Brooklyn, has been incorporated with a capital of $100,000 by M. Fromm, D. Donovan and O. Olson, 161 Ryerson Street, to manufacture machinery, tools, shoe lasts, and other products.

The L. E. Waterman Co., 191 Broadway, New York, manufacturer of fountain pens, has purchased the five-story, reinforced-concrete plant of the General Phonograph Co., Thomas and Mulberry streets, Newark, N. J., for the establishment of a new works and will take title on Feb. 15. Several months ago the company acquired property at Johnson Avenue and Peddie Street and had plans prepared for new works to cost about $1,000,000. This project was deferred and it is now understood will be abandoned. The General Phonograph Co. will lease a section of the building; other equipment now installed will be removed to its factory at Elyria, Ohio.

Bigley Brothers, Inc., Hoboken, N. J., has been incorporated with a capital of $125,000 by M. M., Bernard F. and William J. Bigley, 1604 Willow Avenue, to manufacture trucks and parts.

The Gordon Wrench Corporation, New York, has been incorporated with a capital of $100,000 by E. J. Fenton, H. J. O.Neill and J. H. Dreyer, Jr., Westbury, L. I., to manufacture wrenches and other tools.

The Bergen Point Brass Foundry, 161 Hobart Avenue, Bayonne, N. J., has filed notice of organization to manufacture brass, bronze and other metal castings. Albert W. Lindberg, 125 West Sixth Street, heads the company.

The Perth Amboy Dry Dock Co., foot of Broad Street, Perth Amboy, N. J., operating a shipbuilding and repair plant, is planning for a one-story top addition to its machine shop.

The Buist, Lane, Richardson Engineering Co., New Brunswick, N. J., has been incorporated with a capital of $100,000 by David Buist, Steven J. Lane, and Harry A. Richardson, National Bank Building, to manufacture water and steam specialties.

The Bureau of Yards and Docks, Washington, is planning for the installation of electric hoisting and conveying machinery at the new naval aircraft plant at Lakehurst, N. J.

The Manufacturers' Engineering Co., Newark, has leased a recently completed three-story building at 247 Sherman Avenue, totaling about 5000 sq. ft., for the establishment of a new plant for the manufacture of automobile tire pumps, gasoline recording devices, motor-driven signal horns and other automotive products. Charles G. Klein is president.

The C. A. Goldsmith Co., 270 Thomas Street, Newark, has been incorporated with a capital of $200,000 by Frederick W. Smith, William D. and Arthur D. Goldsmith, to manufacture brass and other metal products.

Hans Bretscher, Newark, N. J., has leased the two-story building at 70-72 Marshall Street to manufacture automotive specialties. It is proposed to commence operations at an early date with an initial working force of over 100 men.

Robert Smith, Irvington, N. J., care of Frederick Lemmer, architect, 688 Nye Avenue, Irvington, has had plans prepared for a new one-story shop, 32 x 95 ft., at 951 Clinton Avenue, to manufacture tools and small metal products. It will cost about $10,000.

The Irvington Electric & Auto Repair Co., 681 Mt. Prospect Avenue, Newark, has been incorporated with a capital of $25,000 by Jacob F. Fritts, 532 Norwood Street, East Orange; Henry W. Wittschiebe and Bernard V. McGovern, 164 Market Street, to operate a machine shop and electrical repair works.

New England

BOSTON, Jan. 17.

In view of recent comment on machine tool values, it is interesting to note some of the prices realized at the auction sale last week of equipment of the Embossograph Products Co., Salem, Mass. A new Cincinnati 26 x 24-in. planer was bid in at $1,025, a Kempsmith No. 3 milling machine at $1,000, a new Brown & Sharpe No. 13 automatic gear cutting machine at $975, and a nearly new Potter & Johnson No. 6A model 2 automatic chucking and turning lathe at $837.50, but practically everything else went for less than $500.

A new Greenfield No. 1 cylindrical grinder was sold for $450, and a new Chandler & Farquhar screw cutting engine lathe at $412.50. Other screw cutting engine lathes offered went at $100 to $262.50 each, the makes including P. Blaisdell & Co., Seneca Falls Mfg. Co., W. P. Davis, South Bend Lathe Works and J. H. Wright, some machines being new or practically so. An almost new F. E. Wells & Son universal cutter and tool grinding machine sold at $162.50, and a R. S. Kelly Machine Co. crank shaper at $275. An Avey three-spindle high speed ball bearing sensitive drill, in excellent condition, brought $250, and a new two-spindle drill made by the same concern, $237.50, while a new W. F. & John Barnes Co. 20-in. upright drill sold at $187.50.

Other sales included a Fox No. 3½ plain milling machine, in very good condition, at $137.50, and a Whitney No. 6 hand and a No. 21 Garvin plain milling machine, both for $337.50, one being new and the other practically new. J. G. Blout speed pattern makers' lathes sold at $70 to $95 each, according to condition, the top price being realized on tools almost new. A Seneca Falls Star Screw cutting or precision bench lathe, in excellent condition, sold for $162.50, a Wellman bench milling machine at $55, a No. 22 Burke bench sensitive drill in good condition at $17.50, and a 10-in. bench drill made by the same concern, in excellent condition, at $25. A new Greenerd No. 3 J. B. S. bench arbor press sold for $45, and a new No. 3½ arbor floor press made by the same firm, for $65.

Very few machine tools have changed hands in the local market the past week. The General Electric Co., West Lynn, Mass., has completed its list of small equipment for the meter department, but has abandoned other requirements. This plant and some others operated by the company in various sections of New England are reducing working forces approximately 20 per cent, and it is reported that a reduction in wages is under consideration. Some machine tool builders in this section are receiving cancellations from the main plant at Schenectady. Two local crane prospects have been abandoned. Although actual sales are few and far between, inquiries for one, two and three tools are slightly more numerous, but prospective purchasers are in no hurry to cover. The United States Cartridge Co., Lowell, Mass., is in the market for special equipment for a phonograph motor proposition, and the Phoenix Mfg. Co., of the same city, pistols, is buying individual machines. A South Acton shop bought a milling machine for approximately $1,000. No further price adjustments are reported. At least one maker of grinding machines is increasing the capacity of his product without a change of price, which in this instance is considered as good as a reduction. The machine tool industry in Worcester and Springfield, Mass., and Providence, R. I., is exceptionally quiet, but in other sections of New England appears to be improving slightly. The Putnam Machine Works, Manning, Maxwell & Moore, Inc., Fitchburg, Mass., after a shutdown of two weeks, resumed operations Jan. 17.

The Stanley Steel Wheel Co., Boston, is in the market for a 4- or 5-ton crane for its Buffalo plant.

The American Metal Parts Corporation, 28 Brighton Avenue, Boston, 34, is in the market for a 14-in. x 6-ft. and 16-in. x 6-ft. engine lathes for production work.

The two-story plant and 47,430 sq. ft. of land belonging to the Embossograph Products Co., Salem, Mass., have been sold at public auction to Atwood & Morrill, steam appliances, who occupied a part of the building. The price paid was $32,750.

J. P. Hartman & Co., Boston, toys, have taken a 10 year lease of the four-story building at the corner of Milk and Exchange streets, Portland, Me., formerly occupied by the

local telephone company, which they will equip for manufacturing. At some future date the company will erect a plant in the suburbs and use the city building for offices and salesrooms.

The Sheppard Envelope Co., Worcester, Mass., has been incorporated with a capital of $200,000, to take over the business and equipment of the J. E. Sheppard Co., envelope machines. It will be located for the present in the new Simplex Piano Co. building, and has sufficient business on its books to operate at capacity for several months.

Contract has been awarded the Kalor Construction Co., Boston, for the erection of a two-story plant, 50 x 100 ft., at 450 Cambridge Street, Allston District, Boston, for the T. L. Harkins Machine Co.

Although no definite arrangements have been made, the New Haven Sherardizing Co., Hartford, Conn., is considering plans for a new building for its mechanical department, the erection of which probably will start next spring.

Work will soon start on a small two-story addition to the plant of the American Machinery & Equipment Co., Newington, Conn.

The Woolsen Mfg. Co., Watertown, capitalized for $300,000, has been incorporated under the laws of Connecticut to manufacture brass goods. The incorporators are Arthur F. Ells, Carroll C. Hincks and William E. Thoms, Waterbury, Conn.

Herbert W. Merry has purchased the shop and land on South Street, Warren Mass., formerly owned by Charles E. Comins, and will enlarge the shop at some future date to manufacture gasoline engines. For the present, however, it will be used for automobile repair work.

The American Steel & Wire Co., Grove Park, Worcester, Mass., is planning for the erection of an electric power house as a central station for entire operating service. The company is now running close to normal at its north and south plants.

The Sturtevant Mill Co., Harrison Square, Boston, manufacturer of crushing and pulverizing machinery, has acquired about 28,000 sq. ft., in the vicinity of its works at Dorchester for future expansion.

The Schumaker-Santry Co., Boston, has been incorporated with a capital of $200,000 by Joseph V. Santry, Brookline; Harry H. Leathers, Melrose; and Ernest M. Chapin, Newton, to manufacture power plant equipment and specialties.

C. H. Gregory, 303 Clinton Avenue, Bridgeport, Conn., has perfected plans for the immediate erection of a new one-story factory, 32 x 100 ft., on East Washington Avenue, to manufacture metal specialties. It will cost about $22,000.

The American Dan Bottle Seal Corporation, Stockbridge, Mass., has been incorporated under Delaware laws with capital of $26,000,000 by Sidney M. Sterbach, Walter L. Clark, Stockbridge; and George D. Cross, Bernardsville, N. J., to manufacture metal bottle seals, caps, etc.

The Greist Mfg. Co., Westville, New Haven, Conn., manufacturer of sewing machine attachments, has increased its capital from $1,100,000 to $1,600,000.

The Kenny Mfg. Co., Cranston, R. I., has been incorporated with a capital of $100,000 by Charles D., George M., and William C. Kenny, Cranston, to manufacture metal curtain rods and other products.

The Conry Motor Co., 671 Main Street, Worcester, Mass., is considering the erection of a new service and repair building, 87 x 132 ft., at Murray Avenue and Wellington Street, to cost about $100,000.

The E. M. Fay Electrical Co., Inc., Worcester, Mass., has been incorporated with a capital of $100,000 by E. Miller Fay, 10 Morningside Road; M. H. Fay and W. H. Stanton, to manufacture electrical appliances and equipment.

The West Bridgewater Foundry, West Bridgewater, Mass., has arranged for the immediate erection of a one-story foundry, 50 x 100 ft. H. E. Bryant is superintendent.

Philadelphia

PHILADELPHIA, Jan. 17.

Horace T. Potts & Co., 316 North Third Street, Philadelphia, iron and steel products, have completed plans for a one-story foundry at Erie and D streets, to cost about $15,000.

The Standard Engineering & Construction Co., Philadelphia, has been incorporated with a capital of $100,000 by J. G. Webber, Joseph F. X. and Edward H. Reuss, Jr., 921 South Forty-sixth Street, to manufacture power plant equipment, piping, etc.

The Elliott-Fisher Co., Cameron Street, Harrisburg, Pa., manufacturer of billing, adding and typewriting machines, is planning for increased output during the year. The 1920 production totaled 11,000 machines, and it is said that this will be practically doubled.

The Lehigh Valley Light & Power Co., Allentown, Pa., has foundation work under way for its new electric generating plant at Hauto, Pa., estimated to cost in excess of $5,000,000 with machinery. The company is operated by the Electric Bond & Share Co., 71 Broadway, New York.

The L. H. Gilmer Co., Keystone and Cottman streets, Philadelphia, manufacturer of belting products, has sold its plant at Allentown, Pa., and will remove the machinery and equipment to its factory at North Wales, Pa., utilizing recent extensions.

Plans for the erection of a two-story machine shop, 51 x 72 ft., at Pier No. 47, to cost $27,000, have been filed by the Pennsylvania Sugar Mfg. Co., 1037 North Delaware Avenue, Philadelphia.

The International Time Recording Co., Endicott, N. Y., manufacturer of time recording clocks and systems, has leased the second floor of the building at 846 North Broad Street, Philadelphia, for new headquarters.

The Keystone Bumper Mfg. Co., Philadelphia, has been organized by William H. Rappeport, 281 South Fifth Street, and associates, to manufacture steel bumper frames and other automotive specialties.

John C. Mueller & Co., Trenton, N. J., has been incorporated with a capital of $100,000 by John C. Mueller, Earl C. Smith and Benjamin H. Bugbee, Trenton, to manufacture roofing products.

The Beaver Building Block Co., Woodlawn, Pa., has completed plans for the erection of a new one-story factory, 60 x 100 ft., to cost about $30,000 with equipment.

The Lite Tractor Corporation, Easton, Pa., has been incorporated with a capital of $750,000 by Richard J. Lippey, Robert N. Fulton and Max J. Kaplin, Easton, to manufacture motor-driven tractors and parts.

The American Boro Products Co., 636 Court Street, Reading, Pa., manufacturer of brass and bronze products, has been acquired by the Boro Products Co., organized under New York laws. The plant will be continued in operation as heretofore, and the purchasing company has taken title to a tract of land in West Reading for the construction of a new plant for a similar line of metal manufacture, estimated to cost about $125,000.

The Hollsopple Specialty Co., Hollsopple, Pa., has been organized by James E. Whewell, Harley I. Yoder and John J. Whewell, Hollsopple, to manufacture mechanical products.

Pittsburgh

PITTSBURGH, Jan. 17.

Machinery sales and inquiries in this district are so few that it is difficult to establish a market. While some dealers have made fairly good sales out of stock and others detect a slight betterment in this month's business compared with that for December and November, there is still a dearth of new lists and many inquiries put out several months ago have not yet been acted upon. Although buyers some time ago were said to be delaying purchases in the expectation of lower prices, reductions which have come out the past week or two seem to have made them more cautious. Price cuts have been announced of 28 per cent in Oster pipe machines and 15 per cent by the Bullard Machine Tool Co. While a number of other manufacturers are said to be meeting the reductions, they have not yet made announcements with regard to prices. Crane business is almost at a standstill, the only live inquiry of importance being that of the International Nickel Co., which is building a new rolling mill at Huntington, W. Va. This company has standardized its specifications in order that all makers can name prices on the same kind of cranes. An award against this inquiry is not expected until next month. The Electric Alloy Steel Co., Youngstown, has placed a 5-ton crane for its Charleroi, Pa., works with the Pittsburgh Crane & Equipment Co., and a duplicate order for one 5-ton jib crane, 18-ft. 6-in. radius, for the Union Tool Co., Carnegie, Pa., has been placed with the same company.

The Keystone Ironing Machine Co., Pittsburgh, is being organized by John F. Conley, E. J. McKenna and E. B. Strassburger, 716 Frick Building, to manufacture ironing machines and other machinery for domestic service. Application for a State charter will be made on Jan. 24.

The Standard Sanitary Mfg. Co., Pittsburgh, manufacturer of galvanized and enameled wares, has increased its capital from $12,000,000 to $20,000,000.

The American Machine Screw Co., Pittsburgh, has been incorporated with a capital of $20,000 to manufacture machine screws, bolts, nuts, etc. Parker Jones, 5532 Wilkins Avenue, is treasurer.

The West Penn Power Co., Pittsburgh, has made application to the Public Service Commission for permission to

issue stock for $2,500,000, the proceeds to be used in part for electric plant extensions and improvements.

The R. I. M. Motors Corporation, Dormont, Pa., recently incorporated, has awarded contract to the Central Home Co., Vandergrift Building, Pittsburgh, for a new two-story service, repair and parts plant on Tennessee Avenue, to cost about $50,000. It will be 90 x 107 ft. Edwin Imler, 1344 Tennessee Avenue, is treasurer.

James Fisher & Son, Charleston, W. Va., are planning to rebuild their automobile machine and repair works, destroyed by fire, Jan. 5, with loss reported at $50,000.

The Austin Machinery Corporation, Railway Exchange Building, Chicago, manufacturer of concrete mixing machines, road machinery, etc., has acquired the plant and business of the Fairmont Machine Co., Fairmont, W. Va. It will be continued in operation as heretofore, devoting certain departments to the Austin line of equipment.

The Dixie Storage Battery Co., Charleston, W. Va., has been incorporated with a capital of $100,000 by A. Hayes, R. Pennywitt, and J. Kenna, Charleston, to manufacture electrical batteries and similar products.

Detroit

DETROIT, Jan. 17.

The local machine tool market remains quiet, only a very few individual sales being recorded and inquiries almost non-existent. Dealers are not placing orders for stock, owing to the uncertainty of the situation.

The Arrow Pump Co., Detroit, recently organized, has commenced the manufacture of small pumps under the trade name of Arrow, which will include centrifugal water circulating pumps for passenger cars, trucks and tractor engines, and for machine tools, double and triple centrifugal, sump and bilge pumps and others for general purposes. These will be supplied for both belt and motor drive. Other types of rotary pumps will be made for machine tools, engine lubricating, household and other uses. The capacities will range from 4 qt. to 25 gal. per min., but later larger sizes will be built. The company's executive and sales offices are at 318 Park Building, Detroit. The organization includes F. M. Cobb, for several years president and general manager Fulflo Pump Co.; W. B. Sparks, R. B. Huyett and H. E. Henry, formerly treasurer, chief engineer and sales manager respectively, of that company. For the past four years Mr. Henry has been associated with the Michigan Machine Co.; R. G. Conley, another member of the organization, was formerly connected with the W. B. Carpenter Co., Cincinnati, and recently has been with the Detroit Commercial Realty Co.

Work is being rushed on the new plant of the Apex Motor Corporation, Ypsilanti, Mich., and rearrangement of the main factory for quantity production has been completed.

The Moulds Brass Foundry, Benton Harbor, Mich., is building a new works which will be completed shortly.

The Fay-Kultzen Foundry Co., St. Joseph, Mich., has changed its name to Fay Foundry Co.

The Jackson Metal Products Co., Jackson, Mich., has increased its capitalization from $20,000 to $100,000.

The Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids, Mich., has increased its capitalization from $24,000 to $75,000.

The Federal Screw Works, 1161 Ellery Street, Detroit, has awarded contract to Soltar, Gales & Saltz, 185 Frederick Street, for a one and two-story and basement plant, 100 x 150 ft., to cost about $42,000. A large portion of the structure will be used as a machine shop.

The Rudy Furnace Co., Dowagiac, Mich., manufacturer of stoves, furnaces, etc., has increased its capital from $250,000 to $650,000.

The Clare Road Machinery Co., Clare, Mich., has been incorporated with a capital of $20,000 by John Northon, F. M. Daine and A. H. Horton, Clare, to manufacture road machinery.

The Steel Furniture Co., Grand Rapids, Mich., has increased its capital from $50,000 to $250,000.

The Michigan Wire Fence Co., Adrian, Mich., has broken ground for an addition, 50 x 60 ft.

The Michigan Screw Co., Lansing, Mich., has increased its capital from $500,000 to $1,000,000.

The Detroit Architectural Iron Works, Detroit, has filed notice of dissolution under State laws.

The Russel Wheel & Foundry Co., Detroit, manufacturer of structural steel specialties, has increased its capital from $750,000 to $1,150,000.

The American Safety Navigation Co., Saginaw, Mich., has plans under way for a new shipbuilding plant to cost in excess of $1,000,000, construction to begin at an early date. R. A. Graham is president.

The Detroit Casket Co., 177 Congress Street, Detroit, has broken ground for a two-story addition on Ash Street, 115 x 165 ft., to cost about $100,000 with machinery.

The American Enameled Magnet Wire Co., Muskegon, Mich., has increased its capital from $250,000 to $600,000.

The Anti-Skid Device Co., Kalamazoo, Mich., manufacturer of automobile equipment, has changed its name to the Automotive Equipment Co.

Chicago

CHICAGO, Jan. 17.

The market remains very quiet, although here and there an order for a single machine is booked and small inquiries, principally for machines for replacement purposes, are more numerous than during the closing weeks of 1920. The Santa Fe has materially reduced its inquiry for the Albuquerque, N. M., shops, and has asked for revised quotations, the inference being that buying is contingent on price reductions. A track supply manufacturer has bought a 30-in. x 18-ft. geared-in-head engine lathe and a 28-in. drilling machine. This company, in contrast with most industrial plants in this section, is busy, having more orders on the books than a year ago. A manufacturer of sheet metal lockers has bought $10,000 worth of miscellaneous equipment for a new shop. Another user purchased $4,000 worth of cylinder grinding equipment for regrinding automobile cylinders. The Chicago Board of Education has taken bids on a 16-in. x 8-ft. engine lathe for the Crane Technical High School. A manufacturer in this territory has received a foreign order for motors and is expected to enter the market for new tools needed on that work.

An Ohio manufacturer of shapers has adjusted prices downward, the reductions varying for different sizes of machines. An Eastern maker of boring mills who reduced prices about 16 per cent in December is reported to be about to announce a further reduction. On the whole, machine tool prices remain unchanged and no word has been received from builders which would indicate that a cut in quotations is contemplated.

The Woodrow Nipple Co., 1313 North Wood Street, Chicago, has let a contract for a one-story factory, 60 x 112 ft., at 824 North Spaulding Avenue, to cost $25,000.

The Oscar C. Rixson Co., manufacturer of door checks, 501 South Jefferson Street, Chicago, has purchased the northeast corner of Carroll and Kilbourne avenues, and will build a one-story factory, 100 x 334 ft., to cost $75,000.

The Commonwealth Steel Co., Granite City, Ill., is erecting a $250,000 addition which will house a chipping room, roughing department and facilities for general utility work.

T. Linga and associates, Waukegan, Ill., have formed a company which has purchased the former plant of the Fulton Mfg. Co. on the south side of the Genesee Street bridge which will be operated as a general machine shop. Later it is planned to develop a kerosene automobile carbureter recently invented by Mr. Linga.

The Peoria Auto Parts Co., Peoria, Ill., has prepared plans for a one-story manufacturing building.

The Griffin Wheel Co., Chicago, is pushing construction work at its new $1,000,000 plant at Council Bluffs, Iowa. The fourth unit is now being erected and machinery is being installed in the other buildings. The plant will cover seven acres.

The Topeka Foundry & Iron Co., Topeka, Kan., has purchased 12 city lots on the corner of Third and Jackson streets as the site for an addition.

The Beckley-Ralston Co., 1801 South Michigan Avenue, Chicago, manufacturer of automobile lamp specialties, has increased its capital from $600,000 to $3,000,000.

The Edward Holt Co., 420 Reaper Block, Chicago, has been incorporated with a capital of $40,000 by Edward Holt, Frank A. Voiles and George A. Stevens, to manufacture metal products.

The Joliet Steel & Iron Co., Joliet, Ill., has awarded contract to the B. & B. Construction Co., 6248 South Michigan Avenue, Chicago, for a one-story foundry addition, 75 x 160 ft., and improvements in its present foundry, estimated to cost about $50,000.

The Miles Piston Ring Co., Chicago, has awarded contract to the Johnson-Regnell Co., 19 South State Street, for a new one and two-story plant, 100 x 160 ft., to cost about $65,000. W. G. Uffendel, 39 South La Salle Street, architect, is in charge.

The Chicago Metal Products Co., Chicago, has filed notice of dissolution under State laws.

The Liberty Car & Equipment Co., Chicago, has increased its capital from $750,000 to $1,250,000.

The R. Stutzke Co., Room 1156, 38 South Dearborn Street, Chicago, has been incorporated with a capital of $50,000 by Theodore G. Remschel and Cuthbert Schaefer, to manufacture machinery and parts.

The Edward Valve & Mfg. Co., 72 West Adams Street, Chicago, is planning to rebuild its plant at East Chicago, Ind., recently destroyed by fire with loss reported at $350,000.

The Variety Mfg. Co., Chicago, has filed notice of change of name to the Variety Fire Door Co., to manufacture metal doors, window frames, etc.

Baltimore

BALTIMORE, Jan. 17.

The Broswick Mfg. Co., 316 St. Paul Street, Baltimore, recently organized to manufacture metal automobile specialties, has acquired a two-story factory, 75 x 80 ft., on St. Paul Street, which it will equip at once. B. B. Broswick is president and manager.

The Shefts Auto Body Co., Inc., 3 East Lexington Street, Baltimore, has been incorporated with a capital of $200,000 by R. E. Lee Young, E. Harvey Peters and Albert K. Sherman to manufacture automobile bodies.

Dietrich Brothers, Baltimore, operating a structural iron and steel works at Pleasant and Davis streets, has plans under way for an addition to cost about $350,000, including machinery, which will provide for the employment of about 100 additional men.

The Lafayette Mill & Lumber Co., Pulaski and Lafayette streets, Baltimore, has completed plans for a one-story power house to cost about $25,000.

The Wizard Check Endorser & Printing Machine Co., 457 Calvert Building, Baltimore, has arranged for a preferred stock issue of $100,000 in connection with the erection of its new plant at Orangeville. F. S. Weise is president.

The Southern Iron & Steel Co., Winston-Salem, N. C., has been organized to manufacture furnaces and general iron and stel products. It is headed by Henry Johnson and J. H. Frazier.

The new plant of the Standard Chilled Castings Corporation, Lynchburg, Va., recently organized, will comprise the local factory of Dawson Brothers, acquired by the company, which will be remodeled and converted into a foundry for the manufacture of agricultural equipment, including plow parts. J. L. Thomas is secretary.

The High Point Motor Co., High Point, N. C., is planning to rebuild its automobile service and repair works, recently destroyed by fire with loss estimated at $200,000, including equipment.

The Goodrich Rubber Co., Upper Peachtree Street, Atlanta, Ga., is planning to rebuild the portion of its plant destroyed by fire, Dec. 28, with loss estimated at $60,000.

J. E. Bernard, 109 Church Avenue, Roanoke, Va., has awarded a contract to J. F. Barbour & Son, Roanoke, for a one-story machine shop on Commerce Street.

G. H. Tilton & Son, Savannah, Ga., are arranging to rebuild the portion of the power plant at their hosiery mill recently damaged by fire, with loss estimated at $25,000.

The Portsmouth Metal & Foundry Co., Portsmouth, Va., has plans under way for rebuilding its one-story foundry at King Street and Louisa Avenue, recently destroyed by fire. A. V. Moore is president.

Cleveland

CLEVELAND, Jan. 17.

A slight improvement in the machine tool market, noted last week, is still in evidence and a better feeling is apparent in the trade. Dealers are receiving a few orders for single tools and two or three preliminary inquiries have developed for lots of several machines, but these are of such an indefinite nature that about the only interest is that they indicate a tendency to consider the starting of new projects when the time is propitious.

Although many leading machine tool builders have announced that they will not reduce prices until there is a reduction in costs, there seems to be a disposition in some quarters to hold back business. Apparently an example of this influence is the National Lamp Works of the General Electric Co., which recently inquired for over 100 machines for a new plant in Buffalo. This buying was postponed until January, and late reports are to the effect that the company will defer the matter until March.

Reports indicate that some automobile companies are preparing to start operations at somewhat increased capacity in the near future. However, no improvement in this field has as yet materialized, and some plants in this section which do a great deal of work for the Ford Motor Co. are practically shut down, owing to a suspension of shipping orders from that company.

The Reynolds Machine Co., Massillon, Ohio, manufacturer of automatic screw driving machinery, announces substantial reductions in its prices.

The Brown Body Corporation, 3041 Superior Avenue, Cleveland, has leased from the Cleveland Belting & Machinery Co. a new factory at Fairfield Road and West Fifteenth Street. The building was designed and erected to meet the commercial body requirements of the Brown corporation.

The Ohio Motor Co., Sandusky, Ohio, has disposed of its plant to the Power Equipment Producing Co., recently incorporated. The Ohio Motor Co., which was organized in 1897 with a capital stock of $100,000, will discontinue business.

The Midvale Clay Products Co., Midvale, Ohio, has been incorporated with a capital stock of $350,000 and will erect a plant to manufacture brick and hollow blocks. Plans are being prepared by the L. E. Rogers Engineering Co., Chicago.

The Fabricated Steel Products Corporation, Leetonia, Ohio, has replaced equipment damaged by fire and operations have been resumed at normal capacity.

The National Supply Co., Toledo, Ohio, has acquired the interest of the Union Tool Co., formerly owned by the Union Oil Co. of California. By this transaction two large manufacturers of oil well supplies have merged their interests, but will continue to operate as separate organizations. The Union Tool Co. has three plants, one in Los Angeles, Cal., West Chicago, and Carnegie, Pa.

Buffalo

BUFFALO, Jan. 17.

The Rochester Castings Corporation, Rochester, capitalized at $2,000,000, has awarded contracts for the erection of four units of its plant at Buffalo Road and Fields Road, that city. Ground will be broken immediately. It is expected that the buildings will be ready for manufacturing operations by June 1. Officers of the company are: President, Charles F. Wray, who is also president National Brass Works and secretary and treasurer of the Henry Wray Foundry Co.; vice-president, Albert N. Wright, secretary and treasurer Wright & Alexander Co.; secretary, Loren O. Graves, president Graves Elevator Works and of the Rochester Foundries, Inc., and treasurer Parker-Rishor Co.; treasurer, George S. Benedict, president and treasurer Rochester Pattern Works and treasurer Rochester Foundries, Inc. The structures to be erected at once are a main foundry, 200 x 400 ft.; cleaning building and pattern shop, 120 x 400 ft.; an executive building, two stories, and a power plant, 50 x 80 ft. The main foundry building will be equipped with three cupolas of 40 tons capacity. The product of the company will be gray iron castings.

The Eastman Kodak Co., Rochester, N. Y., has applied for a permit for the construction of a new machine shop. Plans provide for a building of steel and concrete construction to cost $280,000.

The Buffalo Meter Co., 2917 Main Street, Buffalo, has increased its capital from $200,000 to $400,000.

Carl Suthoff and John Johnson, Buffalo, have acquired a two-story brick building, 30 x 50 ft., at the rear of 1348 Main Street, which they will equip as a general machine shop, with department for automobile repair work.

The Art Work Shop, 445 Ellicott Square, Buffalo, manufacturer of metal specialties, etc., has increased its capital from $70,000 to $250,000.

William J. Terre, Buffalo, has made application to the City Council for permission to operate a welding works in a one-story building at 1248 Fillmore Avenue.

The United States Light & Heat Corporation, 3215 Highland Avenue, Niagara Falls, N. Y., manufacturer of electrical storage batteries, electric lighting and heating equipment, etc., has increased its capital from $7,000,000 to $8,500,000.

The Villard Auto Signal Co., Rochester, has been incorporated with a capital of $100,000 by T. H. Remington, E. B. Leary and J. R. Villard, Rochester, to manufacture automobile signal devices and other automotive equipment.

The Smith & Caffrey Co., 1421 North Salina Street, Syracuse, N. Y., manufacturer of structural and ornamental iron products, castings, etc., has increased its capital from $50,000 to $200,000.

F. A. Reed, Inc., Albion, N. Y., will commence immediately the erection of a new plant for the manufacture of packing pads for fruit transportation, to replace its three-story factory destoyed by fire, Dec. 21, with loss of $175,000, of which about $40,000 was in machinery.

The Rochester Electric Sun Signs, Inc., Rochester, has been incorporated with a capital of $40,000 by B. M. Olcott, H. D. Gardner and V. H. Clymer, Syracuse, to manufacture electrically operated display signs.

Cincinnati

CINCINNATI, Jan. 17.

Receipt of a number of inquiries from different sections of the country is responsible for a better feeling in the machine tool industry in this district. While only a small proportion of these are developing into orders, the fact that they are regarded as bona fide inquiries, gives rise to the belief that perhaps the turning point in the industry has been reached. The feature of the market the past week is the receipt by a local manufacturer of an order for eight lathes for a railroad in South Africa. An order for four lathes is also said to have been placed by the Dutch Government for shipment to one of its colonies, and a Japanese order is said to be under negotiation. According to one manufacturer, a good business can be done with European countries, despite the exchange handicap, provided manufacturers here will consent to the granting of credits extending over a period of years. Some of this business has been accepted. In the domestic market orders for tools for rounding out equipment are being received. A local dealer placed a contract with the McCook Aviation field, Dayton, Ohio, for several machines and it is expected that a Southern railroad will shortly issue a list for new shops contemplated.

The Gould & Eberhardt line of shapers has been reduced 15 to 16 per cent, but no change is made in the gear and rack cutting machines manufactured by this company.

The Cincinnati Planer Co., Cincinnati, has been authorized to increase its capitalization from $400,000 to $1,380,000 to more effectively protect its investments and distribute its assets. The stock will be absorbed by the present holders, and none will be offered to the public.

The Newport Mfg. Co., Newport, Ky., organized to manufacture automobile body trucks, has requested the city commissioners to exempt its plant from taxation for a period of years in case it locates in that city. It is understood that plans call for the construction of works to cost $75,000.

The Williams Cup Co., Middleport, Ohio, has been organized to manufacture convertible sockets and patented cups for pumps, used in oil well drilling. Percy Williams and C. E. Gilliland, Pomeroy, Ohio, are the organizers, and have purchased a factory which will be remodeled for manufacturing.

It is understood that the Milburn Implement Mfg. Co., Milburn, Ky., will erect a plant in Paducah, Ky., and remove to that city. It is capitalized for $225,000, and manufactures farm implements, specializing in a new type of harrow.

The James H. Curran Elevator Co., 114 West Second Street, Cincinnati, has been incorporated with a capitalization of $50,000.

The Safe-Cabinet Co., Marietta, Ohio, has purchased the property of the Leidecker Tool Co. which it has been occupying for some time for assembling purposes. It is five stories and contains about 25,000 sq. ft. of floor space.

The Gulf States

BIRMINGHAM, Jan. 17.

The Tennessee Coal, Iron & Railroad Co., Birmingham, has plans under way for a foundry in the Westfield district for the manufacture of steel castings. It will cost about $300,000.

The Kruger Machinery Co., San Antonio, Tex., manufacturer of machinery and parts, has increased its capital to $250,000.

The Steel Products Corporation, El Paso, Tex., has been incorporated with a capital of $100,000 by J. H. Sandford, Jr., and E. L. Fugale, El Paso, to manufacture iron and steel specialties.

The Fort Worth & Denver City Railroad Co., Denver Record Building, Fort Worth, Tex., is having plans prepared for its new machine and car repair shops at Childress, Tex., to cost about $500,000, with machinery, as part of an extensive program of shop construction in different parts of the State.

The Crawley Book Machinery Co., St. Petersburg, Fla., has been incorporated with a capital of $40,000 by Arthur McRae, L. and Arthur Crawley, St. Petersburg, to manufacture special machinery and parts.

The Able Refinery Co., Houston, Tex., recently organized, is planning the erection of a new oil refinery with initial daily capacity of about 500 bbl. J. L. Able is president.

The Toyah Oil & Refining Co., Toyah, Tex., has plans under way for a new refinery with a daily capacity of about 200 bbl.

The Black Hardware Co., Galveston, Tex., manufacturer of hardware and metal specialties, has increased its capital from $200,000 to $500,000.

The San Antonio Public Service Co., San Antonio, Tex., is planning for extensions in its local electric power plant to cost about $250,000, including remodeling and improving of present structure; new machinery will be installed. The company recently increased its capital from $4,700,000 to $7,000,000 for expansion.

The William Thomas Corporation, Jacksonville, Fla., has been incorporated with a capital of $500,000 by William C. Thomas and H. B. Phillips, Jacksonville; and Cornelius Thomas, Miami, Fla., to manufacture motor trucks and parts.

Indiana

INDIANAPOLIS, Jan. 17.

The Pioneer Brass Works, 424 South Pennsylvania Street, Indianapolis, will defer the erection of its proposed machine shop until spring. It will be one-story, 75 x 175 ft., and is estimated to cost about $45,000. Charles Brossman, 1503 Merchant Bank Building, is architect and engineer; J. H. Brinkmeyer is president.

The Stewart Wire Wheel Corporation, West Bernard Street, Frankfort, Ind., manufacturer of wire wheels for automobiles, has increased its capital from $500,000 to $1,500,000. It is having plans drawn for a new two-story factory, 60 x 85 ft., to cost about $70,000, and will ask for bids early in the spring.

The Chesapeake & Ohio Railroad, Richmond, Va., is planning for the construction of a new power plant, engine house and shops at Boston, Ind.

The Inland Wire & Cable Co., Cleveland, has plans under way for a new one-story plant, 100 x 350 ft., at Hammond, Ind., to cost about $100,000. D. S. Klafter, 64 West Randolph Street, Chicago, is architect.

The City Council, Frankfort, Ind., E. C. McMurphy, city clerk, is considering the erection of a new municipal electric light and power plant to cost about $500,000 with machinery.

The Van Briggle Motor Device Co., Indianapolis, with plants at Fowler and Mooresville, Ind., has been placed in charge of William R. Hirst, receiver. An affiliated organization, the Van Briggle Mfg. Co., has also been placed in receivership.

Milwaukee

MILWAUKEE, Jan. 17.

An encouraging feature of the machine tool market is the increasing interest manifested by prospective buyers. However, the volume of business actually placed so far this year is very small. The automotive industries have reappeared in the market, but to an extremely limited extent. What little buying is being done is largely by manufacturers of heavy machinery and power plant equipment, who are getting some fair orders. Most conspicuous among these is that placed with the Allis-Chalmers Mfg. Co., Milwaukee, by the Illinois Steel Co., South Chicago, which calls for four 48 x 60-in. gas engines and generators of 3000-kw. capacity each, amounting to $1,250,000.

A number of Wisconsin corporations have recently effected substantial increases in capitalization to accommodate the expansion of business and finance past, present and future extension of facilities and production. Among the prominent metal-working concerns are the following: Sterling Motor Truck Co., Milwaukee, from $250,000 to $1,000,000; Dings Magnetic Separator Co., Milwaukee, $100,000 to $150,000; Badger Nail Co., Milwaukee, $25,000 to $50,000; Webster Electric Co., Racine, $600,000 to $1,000,000; C. H. & E. Mfg. Co., Milwaukee, $115,000 to $165,000; Pressed Steel Tank Co., Milwaukee, $200,000 to $800,000; Modine Mfg. Co., Racine, $200,000 to $450,000; B. Hoffmann Mfg. Co., Milwaukee, $150,000 to $300,000; Wisconsin Machinery & Mfg. Co., Milwaukee, $100,000 to $150,000; Herman Andrae Electrical Co., Milwaukee, $50,000 to $100,000; Andrew Mfg. Co., Milwaukee, $50,000 to $100,000; Titan Motor Truck Co., Milwaukee, $100,000 to $150,000; Tri-Clover Machine Co., Kenosha, $30,000 to $50,000; Kahlenberg Brothers Engine Co., Two Rivers, $75,000 to $300,000.

The Schoeffler-Graham Mfg. Co., 158 Reed Street, Milwaukee, has incorporated with a capital stock of $50,000. It conducts a machinery manufacturing business and commercial machine shop. The present owners are A. P. Schoeffler, C. A. Graham and R. B. Randall.

The Sparta Drilling Machine Co., Sparta, Wis., has been chartered to manufacture machine tools and machinery. The initial capitalization is nominal at $2,500. The incorporators are Leo and Robert Canfield and Alfred James, all of Sparta.

The Standard Die Cutting Co., Milwaukee, has been incorporated with a capital stock of $100,000 by Charles, William R. and Charles G. Jurack, who are officers and principal owners of the Charles Jurack Pattern Works, 199 Oregon Street, Milwaukee. The object of the new corporation is to manufacture die castings and similar specialties. The present plant will be used for this purpose. Some new equipment is being purchased.

The Northwest Engineering Works, Green Bay, Wis., which recently increased its authorized capitalization from $1,000,000 to $1,300,000, has completed the erection of three shop units aggregating in area 130,000 sq. ft., and including a new power house and boiler room. Henceforth the entire facilities will be employed in the manufacture of a crawler type of crane designed for industrial yard, logging and similar purposes where the use of rails and fixed trackage is not feasible. Officers of the company are: President, H. G. Barkhausen; vice-president, L. H. Barkhausen; secretary and treasurer, W. W. Mutter. A sales office has been established at 26 East Jackson Boulevard, Chicago.

The Ellwood Tractor Co., Madison, Wis., which built a small machine shop two years ago for experimental and development purposes, is now ready to engage in a regular quantity production. Unless an existing factory can be leased, it proposes to erect a new plant to cost about $100,000, including equipment. C. D. Ellwod is president and chief engineer.

The Chapman Mfg. Co., Berlin, Wis., has been organized by F. D. Chapman to manufacture a new type of ironing machine and other laundry machinery which he has designed and patented. The former Murphy shop building has been taken over and is being equipped. The new company will be distinct from the Schaefer Mfg. Co., of which Mr. Chapman is president.

The Board of Education, Horicon, Wis., has engaged Parkinson & Dockendorff, architects, LaCrosse, Wis., to design a two-story, high school and vocational training institute, 180 x 200 ft., estimated to cost $175,000. Bids will be taken abut March 15. E. W. Simon is president of the board.

The Green Bay Drive Calk Co., Green Bay, Wis., manufacturer of brake assemblies for motor vehicles, will award contracts this week for a one-story brick and concrete forge shop and storage building, 50 x 185 ft., at Ninth and State streets. It will replace that part of the main shop which was damaged by fire in December and with equipment is estimated to cost about $40,000. F. J. Van Laanen is general manager.

The American McKenna Process Co., 373 Broadway, Milwaukee, has filed an amendment to its corporate articles to reduce its authorized capitalization from $10,000,000 to $4,000,000.

The Kewaskum Aluminum Co., Kewaskum, Wis., which on Dec. 1 placed in operation its new factory, has increased its capitalization from $125,000 to $200,000. It manufactures kitchen ware and utensils and is operating at maximum capacity to fill an accumulation of orders.

The Central South

ST. LOUIS, Jan. 17.

The Good-Will Lubricating Co., Arcade Building, St. Louis, manufacturer of lubricating equipment, has completed plans for a new two-story plant at Brown and Geraldine avenues, 50 x 90 ft., to cost about $25,000. John A. Meyer is head.

The Bristow Tool Co., Bristow, Okla., has been incorporated with a capital of $100,000 by A. L. Davis, J. P. McNutt and N. D. Condley, Bristow, to manufacture oil well tools and machinery.

The Missouri, Kansas & Pacific Railroad Co., St. Louis, has broken ground for its new shops at Oklahoma City, Okla., to cost about $200,000, with machinery.

The Concrete Products Co., Caldwell Murdock Building, Wichita, Kan., is planning the erection of a new two-story plant, 150 x 200 ft., at Thirteenth Street and Rock Island Avenue, to cost about $50,000. K. M. Baker is secretary.

The Metropolitan Electric Service Co., Oklahoma City, Okla., has been incorporated with a capital of $50,000 by Walter W. Hawkins, T. N. Wells and Cody Fowler, to manufacture electrical equipment.

The Tennessee Silo & Tank Co., Knoxville, Tenn., recently organized, has acquired a local building for the manufacture of water tanks and other specialties. John J. Graham, 210 Humes Street, is president, treasurer and general manager.

The Belknap Hardware & Mfg. Co., Second and Washington streets, Louisville, is taking bids up to Jan. 24 for its new seven-story and basement works, 190 x 190 ft., at First and Water streets, to cost about $400,000. William Hanover is president. Joseph & Joseph, Francis Building, are architects.

The United States Government Engineers' Office, First District, Post Office Building, Cincinnati, is drawing plans for a new one-story power plant, 30 x 57 ft., approximately, at Ohio River Dam No. 33, near Mayville, Ky.

The Lawton Refining Co., Lawton, Okla., is planning for the construction of a new pipe line from the Empire City oil fields to Lawton, estimated to cost about $150,000. G. S. Holiman is manager.

The Dixie Belle Refining Co., 1605 Inter-Southern Life Building, Louisville, is taking bids for its proposed refinery near the local fair grounds, estimated to cost about $500,000, including machinery. H. G. Murphy is vice-president and general manager.

The Martin Construction & Engineering Co., Lexington, Ky., has preliminary plans under way for the erection of a new refinery, with initial capacity of about $150,000 bbl.

The Henryetta Oil & Refinery Co., Henryetta, Okla., is in the market for about $50,000 worth of equipment.

The Atchison, Topeka & Santa Fe Railroad, F. M. Bisbee chief engineer, Amarillo, Tex., will equip 300-ton capacity concrete automatic electric coaling and sanding plants at Cushing, Guthrie and Skedee, Okla.

Fire, Jan. 6, destroyed the automobile service and repair plant of the Marianna Motor Car Co., Marianna, Ark., with loss estimated at $142,000, including machinery.

Canada

TORONTO, Jan. 17.

While the demand for machinery is mostly for small equipment, orders for heavy machines are showing more life. Encouraging reports announce the re-starting of factories which have been closed for the past few weeks and that automobile concerns are gradually putting their plants into operation again.

Elliott & Whitehall, Galt, Ont., manufacturers of small tools, etc., who are erecting a factory, expect to occupy their new premises in the spring.

The city of Kingston, Ont., has granted a site to the Kelly Driver Co., which will start work in the near future on the erection of a plant.

The Montreal Light, Heat & Power Co., 83 Craig Street, West, Montreal, is having plans prepared for an addition to its power house. M. Wilson is chief engineer.

The Town Council, Parry Sound, Ont., is asking quotations on one tubular steel boiler, 12 ft. long, 60 in. diameter, 125 lb. steam pressure. J. D. Broughton is clerk.

The Hamilton Sales Co., Ltd., Hamilton, Ont., has been incorporated with a capital stock of $50,000 by Philip R. Morris, John A. Christilaw, Jean C. Morris and others to manufacture automobiles, trucks, tractors, etc.

The Equator Mfg. Co., Ltd., Hamilton, Ont., has been incorporated with a capital stock of $40,000 by William W. Gabbott, Burton M. Fudge, James B. Johnson and others to manufacture electrical equipment, machinery, etc.

California

LOS ANGELES, Jan. 11.

The Axelson Machine Co., Boyle Avenue, Los Angeles, manufacturer of oil well pumps and fittings, castings, etc., is planning the erection of a branch plant on Walsh Street, St. Louis, to cost about $50,000. P. J. Bradshaw, International Life Building, St. Louis, is architect.

The Consolidated Vanadium Co., 1225 Washington Building, Los Angeles, has been organized by E. P. Truitt, W. S. Greene and H. R. Boyd. Contract for a plant at 2485 Hunter Street, was awarded recently to the Union Iron Works, Los Angeles.

The Little & Robertson Co., Los Angeles, has acquired property at Enterprise Street and Santa Fe Avenue, as a site for a new fabricated steel works. Preliminary plans are under way.

The Acme Machine Co., Anaheim and Gladys avenues, Long Beach, Cal., has filed notice of organization to manufacture machinery and parts. A. T. Cooper, 1723 Linden Avenue, and L. F. Valentine, 128 East Eighth Street, Long Beach, head the company.

The Pacific Lumber Co., Fortuna, Cal., is arranging for the construction of a new power plant and complete electrification of its works. The installation will include a 2000-hp. generator.

NEW TRADE PUBLICATIONS

Steel Hoists, Hand Cranes and Trolleys.—Wright Mfg. Co., Lisbon, Ohio. Catalog No. 10, 47 pages, 6 x 9 in. Illustrates and describes steel hoists, hand cranes and steel trolleys. The chain hoists are made in three types: high speed or spur geared hoists, standard screw hoist and differential block—all hand operated and made in different capacities. The differential chain block is made in capacities of ¼ to 2 tons, and the steel trolleys in both plain and geared form in all capacities up to and including 10 tons and larger if desired.

Electric Cranes, Hoists and Horizontal Drills.—Milwaukee Electric Crane & Mfg. Co., Milwaukee. Catalog, 48 pages, 7½ x 10½ in. Deals with electric cranes both standard and special, including an all steel crane designed for steel mill service; monorail hoists of double truck type built in capacities of 3 to 10 tons, and a horizontal drilling and boring machine especially suited for operating at one setting on pieces too long or bulky for the usual type of machine. Numerous views show crane installations and crane details.

Twist Drills, Reamers and Tools.—Fastfeed Drill & Tool Corporation, Toledo, Ohio. Catalog No. 14, 93 pages, 6 x9 in. Deals with a line of high speed twist drills, reamers and tools, the latter including slitting saws, end mills and Woodruff keyway cutters. A number of pages are devoted to pertinent general information. The catalog is illustrated and thumb indexed.

Leather Belting, Straps and Leather Specialties.—Consolidated Belting Co., Germantown and Sedgley avenues, Philadelphia. Catalog No. 12. Concerned with leather belting, straps and leather specialties, marketed under the trade name Hycalibre. Views of the company's plants are shown and information on belting problems and their solutions and essential belting formulae are included.

Factories.—H. K. Ferguson Co., 6523 Euclid Avenue, Cleveland. Catalog, with the title "Better Buildings," 55 pages, 8½ x 11 in. Gives details of Ferguson standard factory buildings, built of concrete, brick and steel in a number of standard designs. Numerous views of completed factories are shown.

Defectoscope and Magnetic Analyzer.—Holz & Co., 17 Madison Avenue, New York. Bulletin No. 41. Illustrates and describes the Burrows defectoscope and magnetic analyzer for the inspection of steel rails, rods, wire, cable and other steel and iron stock of uniform section.

Marcy Ball and Roller Mills.—Mine & Smelter Supply Co., 42 Broadway, New York. Two catalogs. Catalog No. 62 deals with the Marcy ball mill, built in six sizes, for the wet crushing of ores. Another catalog illustrates and describes the Marcy roller mill, for both wet and dry grinding It is designed with an open end by means of which a low pulp line is maintained and through which the worn rods can be removed and replaced with new ones, and is built in four standard sizes.

Fluid Heaters.—Ross Heater & Mfg. Co., Buffalo, New York. Catalog F. Describes Ross heaters of the closed or tubular type for heating oil, chemical compounds, or other liquids where an increase in temperature is required. It is built in two types: an instantaneous heater in which the liquid is heated as it is being used, and the other a storage heater which has a storage capacity that can be drawn on in emergencies. The catalog is illustrated.

Vertical Triplex Power Pumps.—Aldrich Pump Co., Allentown, Pa. Catalog No. 49. Illustrations and descriptions of single-acting outside-packed plunger vertical triplex power pumps of pot-chamber and modified pot-chamber water-end types, adapted for high pressure pumping requirements as encountered about steel plants, boiler works, rolling mills, etc.

Motion Pictures for Advertising.—Ad-Photo-Scope Co., 308 North Michigan Boulevard, Chicago. Booklet describing the Ad-Photo-Scope, a machine designed to use the motion picture as a medium of expression for advertising, demonstration and education. The film is in the lower section of a steel cabinet and the pictures are projected to the rear of the upper section of the cabinet. No operator, rewinding of the film, darkened room or special light are required.

Metal Windows.—Campbell Metal Window Corporation, 8 West Fortieth Street, New York. Folder. Specifications and descriptions of solid metal windows with double hung sash counterbalanced with weights. All parts of the sash and parts of the frame are formed of No. 12 gage blue annealed steel, the balance being No. 16 gage.

Leather Packings and Specialties.—Chicago Belting Co., Chicago. Catalog. Illustrates and describes a line of leather packings, cups, valves and leather specialties.

Pumping Machinery.—Chalmers Pump and Mfg. Co., Lima, Ohio. Bulletin 102. Refers to those sizes and types of Canton-Hughes duplex steam pumps of most universal use.

Traveling Cranes, Electric Hoists and Trolleys.—Roeper Crane and Hoist Works, 1730 North Tenth Street, Reading, Pa. Catalog. Describes a line of traveling cranes, electric hoists, trolleys and accessories. The traveling cranes illustrated include single and double I-beam cranes and suspended cranes operated by hand power, and electric cage or floor operated cranes.

Cost Engineering Service.—Denham Costfinding Co., Sloan Building, Cleveland. Booklet No. 22, with the title "The Denham Costfinder for General Managers." Emphasizes the need for a cost record system and explains the cost engineering service which the company is prepared to furnish for the analysis of manufacturing conditions, and the planning and installation of practical cost systems.

Speed Indicators.—C. H. Boulin, 82 Duane Street, New York. Illustrates and describes the Hasler speed indicator designed to give speeds of rotation in r.p.m, also linear and circumferential or cutting speeds in yards per minute. It is based on direct measurement of distance in unit of time and no stop watch is required.

Ventilators and Registers.—Independent Register and Mfg. Co., Cleveland. Booklet. Illustrations and descriptions of adjustable ceiling ventilators, wall ventilators, smoke pipe registers, double heater registers and stove pipe thimbles.

Electric Cranes, Hoists, Horizontal Drilling and Boring Machines and Excavating Machinery.—Pawling & Harnischfeger Co., Milwaukee. Booklet, 58 pages, 5 x 7½ in. Largely given to an outline of the company's history, its personnel, physical size, facilities, and products. Views of company officials, various portions of the plant, and company products, including electrical cranes, hoists, monorail overhead conveyors, horizontal drilling and boring machine and excavating machinery are shown.

Electrodes for Electric Furnaces.—Republic Carbon Co., Niagara Falls, N. Y. Catalog. Gives a review of the development of the electric furnace, points out advantages and gives a description of the manufacture of the carbon electrode. Tables and pertinent data are included.

Floodlight Projectors and Reflectors.—Crouse-Hinds Co., Syracuse, N. Y. Bulletin No. 304-A. Illustrates and describes Imperial floodlight projectors and Imperial reflectors, designed for floodlighting for industrial purposes, particularly for railroads and steel plants.

First Aid Treatment.—Denver Chemical Mfg. Co. Booklet, by Edward Kirk, M.D., Philadelphia, with the title "Industrial Injuries and Their First Aid Treatment." Describes treatments for injuries principally of a minor nature and treatments for some of the lesser ailments, with special reference to applications of antiphlogistine.

Vertical Surface Grinder.—Blanchard Machine Co., 64 State Street, Cambridge, Mass. Catalog No. 16, 40 pages, 8¼ x 11 in. Illustrates and describes a high power vertical surface grinder No. 16, made in direct, floor and overhead motor drive types and countershaft type. A number of pages are devoted to a continuous reading caliper attachment, magnetic chuck and face plate, plain face plate and wheel mounter for Blanchard wheels. Some typical examples of the work performed are shown.

Clam Shell Buckets.—Blaw-Knox Co., Pittsburgh. Leaflet. Discusses lever arms, rated capacities and S-bends, illustrated in natural colors. Another circular describes in detail the Blaw Bulldog bucket, which is illustrated in action and in diagram.

Excavator Crane.—Pawling & Harnischfeger Co., Milwaukee. Bulletin 5X. Describes the company's excavator crane No. 205. Illustrates and shows the excavator at work equipped with a digging bucket, a backfilling scraper bucket, clam shell bucket, lifting magnet, special grappler for lumber, sling chains, etc. Details of construction, specifications and operation are included.

Calendar.—Hazard Mfg. Co., Wilkes-Barre, Pa. Consists of six sheets, 14 x 18 in., printed on both sides. Each sheet shows a three months' calendar.

Chicago Pneumatic Tool Co., 6 East Forty-fourth Street, New York. Comprises 12 pages, 12¼ x 24 in., each bearing a three months' calendar. The upper portion of each sheet shows pneumatic hammers, air drills, spike drivers, air compressors and other of the company's products in operation.

Hiram Swank's Sons, Johnstown, Pa. A single sheet bearing a 12 months' calendar pad, 25½ x 13½ in. The sheet is 35 x 46 in. and bears a large picture in colors, with the title "There's a Long, Long Trail a Winding," from a painting by Warde Traver.

Current Metal Prices

On Small Lots, from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes*

Bars:	Per Lb.
Refined bars, base price	3.70c.
Swedish bars, base price	15.00c.
Soft steel bars, base price	3.48c. to 3.70c.
Hoops, base price	4.18c. to 4.65c.
Bands, base price	4.18c. to 4.65c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.58c. to 3.80c.
Channels, angles and tees under 3 in. x ¼ in., base	3.48c. to 3.70c.

*The low prices are those of the Carnegie Steel Co. and are subject to a cartage charge of 15c. per 100 lb. in the Metropolitan district and 10c. per 100 lb. to local points in New Jersey.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	4.25c.
Toe calk, ½ x ⅝ in. and larger	5.00c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	6.50c. to 8.00c.
Shafting and Screw Stock:	
Rounds	5.50c.
Squares, flats and hex	6.00c.
Standard cast steel, base price	15.00c.
Best cast steel	20.00c.
Extra best cast steel	25.00c.

Tank Plates—Steel

¼ in. and heavier	3.78c. to 4.00c.

Sheets

Blue Annealed	Per Lb.
No. 10	4.68c. to 4.90c.
No. 12	4.73c. to 4.95c.
No. 14	5.00c.
No. 16	5.10c.

Box Annealed—Black

	Soft Steel C.R., One Pass Per Lb.	Wood's Refined, Per Lb.
Nos. 18 to 20	5.80c.	.....
Nos. 22 and 24	5.85c.	6.80c.
No. 26	5.90c.	6.90c.
No. 28	6.00c.	7.00c.
No. 30	6.25c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized	Per Lb.
No. 14	6.00c. to 6.35c.
No. 16	6.25c. to 6.60c.
Nos. 18 and 20	6.40c. to 6.75c.
Nos. 22 and 24	6.55c. to 6.90c.
No. 26	6.70c. to 7.05c.
No. 27	6.85c. to 7.20c.
No. 28	7.00c. to 7.35c.
No. 30	7.50c. to 7.85c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
⅛ in. Butt...	—40	—23	¾-1½ in. Butt.	— 3	+17
¾-3 in. Butt.	—44	—28	2 in. Lap.....	+ 3	+21
3½-6 in. Lap.	—39	—24	2½-6 in. Lap...	+ 1	+17
7-12 in. Lap..	—32	—15	7-12 in. Lap....	+12	+30

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	5.75c.
Annealed soft	5.75c.
Galvanized annealed	6.50c.
Coppered basic	6.25c.
Tinned soft Bessemer	7.25c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	22 c. to 22½c.
High brass wire	22¾c. to 23½c.
Brass rod	19¾c. to 22½c.
Brass tube	37¾c. to 39½c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 23¼c. to 24¼c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb....	$8.30	$8.05
		90 lb....	8.40	8.15
		100 lb....	8.50	8.25
IC.. $12.15	$11.15	IC....	8.75	8.50
IX.. 13.95	12.95	IX....	9.75	9.50
IXX.. 15.75	14.55	IXX....	10.75	10.50
IXXX.. 17.35	16.15	IXXX....	11.75	11.50
IXXXX.. 18.95	17.75	IXXXX....	12.75	12.50

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$8.85
IC	9.00
IX	10.00
Fire door stock	12.00

Tin

Straits pig	40c.
Bar	45c. to 50c.

Copper

Lake ingot	16c.
Electrolytic	16c.
Casting	16c.

Spelter and Sheet Zinc

Western spelter	7½c. to 8c.
Sheet zinc, No. 9 base, casks	13½c. open 14c.

Lead and Solder*

American pig lead	5¾c. to 6¾c.
Bar lead	6¾c. to 7½c.
Solder, ½ and ½ guaranteed	27c.
No. 1 solder	24½c.
Refined solder	20½c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.

Antimony

Asiatic	7½c. to 8½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.... 35c to 38c.

Old Metals

The sentiment in the market is better and dealers generally are looking forward to better business in the near future. Dealers are buying a little more freely at the following nominal prices:

	Cents Per Lb.
Copper, heavy and crucible	10.50
Copper, heavy and wire	9.75
Copper, light and bottoms	8.25
Brass, heavy	6.50
Brass, light	4.75
Heavy machine composition	9.50
No. 1 yellow brass turnings	6.00
No. 1 red brass or composition turnings	8.00
Lead, heavy	4.00
Lead, tea	2.75
Zinc	3.00